

# **. J TURE FISHERIES IMPROVEMENT PROGRAM**

## **REPORT TO THE 2009 LEGISLATURE AND FISH, WILDLIFE AND PARKS COMMISSION**



**Montana Fish,  
Wildlife & Parks**

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### Cover photos

Center – Future Fisheries Review Panel receiving an award from the Blackfoot Challenge

### Clockwise starting from upper left –

Future Fisheries Review Panel inspecting completed riparian enhancement project on Salmon and Rock creeks located in the Blackfoot River drainage

HDPE pipe being prepared for installation for a siphon to carry Republican Diversion water underneath Skalkaho Creek in the Bitterroot River drainage

Future Fisheries Review Panel inspecting completed channel restoration project on the South Fork Big Swamp Creek located in the Big Hole River drainage

Ruby Range tour participants inspecting completed channel restoration and instream flow enhancement project on Lazyman Creek located in the Ruby River drainage



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**MONTANA FISH, WILDLIFE AND PARKS**  
**Fisheries Division**  
**Habitat Protection Bureau**

**Future Fisheries Improvement Program**  
**And**  
**Bull Trout and Cutthroat Trout Enhancement Program**

**SUMMARY REPORT 1995-2008**

**Introduction**

The Future Fisheries Improvement Program (HB349) provides funds for *“the long term enhancement of streams and stream banks, in stream flows, water leasing, lease or purchase of stored water, and other voluntary programs that deal with wild fish and aquatic habitats.”* The Future Fisheries Improvement Program was supplemented in 1999 when the legislature enacted the Bull Trout and Cutthroat Trout Enhancement Program (HB647), which *“provides for the enhancement of Montana bull trout and cutthroat trout populations through voluntary enhancement of spawning areas and other habitat for the natural reproduction of bull trout and cutthroat trout.”*

The enabling legislation for the Future Fisheries Improvement Program calls for Montana Fish, Wildlife and Parks to *“present a detailed report to each regular session of the legislature on the progress of the future fisheries improvement program. The legislative report must include the department’s program activities and expenses since the last report and the project schedules and anticipated expenses for the ensuing 10 years’ implementation of the future fisheries improvement program.”*

This report summarizes the status of all projects that have been approved since the Future Fisheries Improvement and Bull Trout and Cutthroat Trout Enhancement programs began in 1995 and 1999, respectively, and includes a brief narrative description of all projects approved since the last reporting period, highlighting projects that restore habitat for bull trout and cutthroat trout (eligible for funding under HB647). Projects that restore habitat damaged by past mining activities and funded since the last reporting period also are identified – Collar Gulch near Lewistown and Whites Gulch near Helena. The report also summarizes activities and expenditures associated with the two programs since the last reporting period, as well as project schedules and anticipated expenses for the ensuing 10 years. Examples of successfully completed projects funded or partially funded through the two programs are included in the report using before and after photographs. Finally, monitoring results for numerous selected projects are summarized in detail in **Appendix A**.

**Appointed Future Fisheries Review Panel Members**

Review panel members during this report period included: **Jim Stone**, irrigator and rancher, Ovando; **Ann Schwend**, Ruby Valley Conservation District Supervisor,



Sheridan; **Alan Johnstone**, commercial rancher, Wilsall; **Traci Sylte**, stream restoration professional, Missoula; **Brent Mabbott**, fishery biologist, Butte; **Chris Strainer**, licensed angler, Trout Unlimited, Helena; **George Golie**, licensed angler, Great Falls; **Ron Steiner**, Plum Creek Timber Company, Columbia Falls; **Chuck Dalby**, hydrologist, Department of Natural Resources and Conservation, Helena; **Marsha Marie Williams**, high school student, Lewistown, 2007; **Corey Sterling**, high school student, Fairfield, 2008; Senator **Steve Gallus**, Butte; Representative **Rick Jore**, Ronan, **Dr. Marvin Miller (Chairman)**, Bureau of Mines and Geology, Butte; and **Tom Martin (ex-officio)**, Montana Department of Transportation, Helena. The Future Fisheries Improvement Review Panel met four times since last report – January 2007, July 2007, January 2008, and July 2008. Applications for funding to the Future Fisheries Improvement Program are due before January 1 and July 1 of each year to be considered for the subsequent funding period.

### **Program Goals**

In 1995, the Future Fisheries review panel determined that potential projects must accomplish one or more of the following goals: 1) Improve or maintain fish passage; 2) Restore or protect naturally functioning stream channels or banks; 3) Restore or protect naturally functioning riparian areas; 4) Prevent loss of fish into diversions; 5) Restore or protect essential habitats for spawning; 6) Enhance stream flow in dewatered stream reaches to improve fisheries; 7) Improve or protect genetically pure native fish populations; or 8) Improve fishing in a lake or reservoir.

### **Program Staffing (HB349)**

The enabling legislation for both the Future Fisheries Improvement Program and the Bull Trout and Cutthroat Trout Enhancement Program authorized the use of program funds for FTE's. HB 349 stated, *"In order to implement (the program) the department may expend revenue from the future fisheries improvement program for up to two additional full-time employees."* Subsequently, the Department allocated two FTE's to the program, but base dollars were utilized to fund these two FTE's rather than using funds from the program. Over the thirteen years the Future Fisheries Improvement Program has been in existence, program savings have totaled approximately \$1.6 million that, as a result, then became available for habitat projects through the program.

Mark Lere has been the Program Officer since November 1997. Mark is responsible for reviewing project applications, visiting the sites of proposed projects, communicating Department recommendations to the review panel, completing Montana Environmental Protection Act requirements, developing project proposals, coordinating with consultants and contractors who design and perform restoration projects, working with landowners and other citizens who need help in developing project proposals, implementation monitoring and maintaining a comprehensive program database.

Other program staff included fishery biologist George Liknes who was responsible for monitoring the effectiveness of completed projects, as well as developing and overseeing

new projects. George left the position at the end of 2007 and his replacement, Linnaea Schroeer-Smith, began in early 2008 with the same responsibilities. Her monitoring report is presented in **Appendix A**.

### **Program Staffing (HB647)**

Similarly, HB 647 stated, *“In order to implement (the program), the department may expend revenue from the bull trout and cutthroat trout enhancement program for one additional FTE and one contractor to assist the review panel.”* The Department has used HB 647 program funds to fill this FTE, which was split among three individuals who, as a part of their positions, are required to organize and complete projects that are eligible for funding under the Bull Trout and Cutthroat Enhancement Program. A contractor has not been hired.

Biologist Lee Nelson (0.5 FTE, from HB 647) is responsible for westslope cutthroat trout restoration efforts in Montana Fish, Wildlife and Parks (MFWP) Region 3 - Bozeman management area). David Moser (0.25 FTE, from HB 647) is responsible for westslope cutthroat trout restoration efforts in MFWP Region 4 – Great Falls management area and Carol Endicott (0.25 FTE from HB 647) is assigned to develop and conduct habitat restoration for Yellowstone cutthroat trout in the upper and mid-Yellowstone River drainages located in MFWP Regions 3 and 5 – Bozeman and Billings management areas, respectively. Expenditures for FTE and operations associated with the Bull Trout and Cutthroat Trout Enhancement Program (HB 647) since the last report (covering the period from 11/1/06 through 10/31/08) totaled \$131,887.94 (\$103,989.67 from HB647, 02410, 38011 and \$27,898.27 from HB647, 02022, E1131).

### **Program Appropriations**

Appropriations to the two programs since their inception are summarized in **Table 1**. This summary includes \$510,000.00 earmarked by the 1995 legislature for projects to enhance fisheries in the Tongue River; an additional \$275,000 was appropriated towards this purpose by the 1999 legislature, but these latter dollars were not Future Fisheries program funds. These earmarked 1995 and 1999 funds were used to construct a fish screen on the T&Y Diversion to prevent the loss of fish down the diversion ditch. The Tongue River Project was jointly administered by the state of Montana, the Northern Cheyenne Tribe and the United States Bureau of Reclamation.

### **Program Projects and Expenditures**

As of October 31, 2008, the Future Fisheries Review Panel and the Fish, Wildlife and Parks Commission have fully or partially approved funding for 526 projects since the program began in 1995. Of these, 381 have been completed, 17 are ongoing, 45 are pending and 83 have been cancelled for various reasons (**Table 2**). Approval of these projects has generated approximately \$24 million in matching contributions. **Table 3** details all projects approved by the Fish, Wildlife and Parks Commission, excluding cancelled projects, since program inception. **Table 4** details all projects that remain

active and includes all expenditures since the last report (November 1, 2006 through October 31, 2008). Narrative descriptions of all project approved since the last reporting period begin on page 19 and examples of successfully completed projects showing before and after photographs begin on page 30.

#### **Anticipated Expenses For Ensuing 10 Years**

Over the last 13 years since program inception, the Montana Fish, Wildlife and Parks Commission has committed, on average, about \$0.72 million per year to habitat enhancement projects. Over the next 10 years, we anticipate expending \$1.44 to \$2.0 million per biennium or \$7.2 to \$10 million over the next 10 years.

**TABLE 1.** A summary of legislative appropriations made to the Future Fisheries Improvement Program and the Bull Trout and Cutthroat Trout Enhancement Program (BT/CTT).

<b>SESSION</b>	<b>FUND AND SUBCLASS</b>	<b>AMOUNT</b>
1995	General License, 26306, E125	\$510,000.00
	River Restoration, HB5, 26301	\$290,000.00
	General License, HB349, 02409, ET30	\$220,000.00
	General License, HB349, 02409, ET2	\$1,250,000.00
1997	River Restoration, 02149, 28466	\$70,000.00
	General License, 02409, E131	\$1,310,000.00
1999	River Restoration, 02149, E190	\$300,000.00
	General License, 02409, E190	\$1,170,000.00
	General License, HB647, 02409, 38011 (BT/CTT)	\$750,000.00 <sup>a</sup>
2001	River Restoration, 02149, EI115	\$260,000.00
	General License, 02409, EI115	\$750,000.00
	RIT, 02022, EI115 (BT/CTT)	\$850,000.00
2003	River Restoration, 02149, EI131	\$210,000.00
	RIT, 02022, EI131 (BT/CTT)	\$700,000.00
2005	River Restoration, 02149, EI150	\$190,000.00
	RIT, 02022, EI150 (BT/CTT)	\$1,000,000.00
2007	River Restoration, 02149, EI170	\$314,000.00
	RIT, 02022, EI170 (BT/CTT)	\$1,000,000.00

<sup>a</sup> Beginning in FY-2000, this appropriation was used to pay for the one FTE and operating expenses that are eligible for the HB 647 source of funding. Additionally, \$198,465.00 was spent on habitat projects approved through the program.



**TABLE 2.** The status of projects funded by the Future Fisheries Improvement Program. by year, as of October 31, 2008.

<b>YEAR</b>	<b># COMPLETE</b>	<b># ONGOING</b>	<b># PENDING</b>	<b># CANCELLED</b>	<b>TOTAL</b>
1996	41			7	48
1997	39			6	45
1998	39			10	49
1999	43			7	50
2000	36			8	44
2001	27			8	35
2002	34			7	41
2003	30	2		9	41
2004	28	3		8	39
2005	26	1	1	3	31
2006	17	6	8	9	40
2007	19	2	15	0	36
2008	3	2	21	1	27
<b>TOTALS</b>	<b>381</b>	<b>17</b>	<b>45</b>	<b>83</b>	<b>526</b>

**TABLE 3.** Future Fisheries Improvement Program project status as of October 31, 2008. Cancelled projects have been removed from this Table. Projects highlighted in bold and italicized were eligible for funding under House Bill 647 (Bull Trout and Cutthroat Trout Enhancement Program).

FFI#		PROJECT NUMBER, NAME & YEAR	APPLICANT	EXPECTED YEAR OF COMPLETION
<b>1996 WINTER FUNDING CYCLE</b>				
001-96	1	Cress Spring Creek Fence	Landowner	Complete
002-96	2	Dunham Creek Fish Screen	FWP/Landowner	Complete
003-96	3	O'Brien Creek Restoration	FWP/Landowner	Complete
004-96	4	Gold Creek Pool Development	FWP/Landowner	Complete
005-96	5	Rock Creek Restoration	Consult/Landowner	Complete
006-96	6	Steel Creek Restoration	FWP/Landowner	Complete
007-96	7	Cottonwood Creek-Dreyer Diversion	FWP/Landowner	Complete
011-96	8	Sweathouse Creek Enhancement	Landowners	Complete
013-96	9	Little Beaver Creek Riparian Fence	Landowner	Complete
014-96	10	Upper Big Hole River Flow Enhancement	USFWS/Landowner	Complete
016-96	11	Whites Gulch Riparian Fence & Revegetation	USFS	Complete
017-96	12	Deep Creek Channel Restoration	FWP/Landowners	Complete
018-96	13	Lake Francis Shoreline Stabilization	Cons. District	Complete
020-96	14	Dick Creek Restoration	USFWS/Landowner	Complete
021-96	15	Mol Heron Creek Flow Enhancement	Landowner	Complete (supplemented by 018-97)
022-96	16	Fort Peck Breakwater - Spawning Reef	ACOE	Complete
024-96	17	Nelson Reservoir Spawning Vegetation	FWP	Complete
025-96	18	Nelson Reservoir Spawning Reef	FWP	Complete
027-96	19	Bear Paw Reservoir Spawning Enhancement	FWP	Complete
028-96	20	Slemmons Pond Dam Removal	FWP	Complete
030-96	21	Big Hole River Channel Restoration	TU/Landowner	Complete
031-96	22	Ruby River Bank Stabilization	FWP/Landowner	Complete
033-96	23	Dry Creek Rehab. & N. Fork Blackfoot	TU/Landowner	Complete
036-96	24	Madison Spring Creek Rehabilitation	Consult/Landowner	Complete
037-96	25	Elk Creek Rehabilitation	USFWS/Landowner	Complete
039-96	26	NCAT - Agrimet Flow enhancement	NCAT	Complete
<b>1996 SUMMER FUNDING CYCLE</b>				
041-96	27	Prickly Pear Creek Fence & Bank Stabilization	Landowner	Complete
042-96	28	St. Regis River Channel Restoration	FWP/Landowner	Complete
043-96	29	Little Sheep Creek Channel Restoration	USFS	Complete
044-96	30	Cottonwood Creek	FWP	Complete
045-96	31	North Fork Fish Screens	FWP/Landowner	Complete
046-96	32	Blackfoot River Bank Stabilization	Consult/Landowner	Complete
048-96	33	Blanchard Creek Riparian Fence	DNRC	Complete
049-96	34	Elk Creek Assessment	Watershed group	Complete
050-96	35	Beaverhead, Van Camp & Rattlesnake Slough	Landowner	Complete
051-96	36	Bitterroot River Fence	Landowner	Complete
053-96	37	Echo Lake Bass Rearing Habitat	Bassmasters	Complete
054-96	38	Magpie Creek Fish Passage	Landowner	Complete
055-96	39	Teton River Bank Stabilization	Cons. District	Complete
056-96	40	Canyon Creek Bank Stabilization	Landowner	Complete
057-96	41	Missouri River Bank Stabilization	Landowner	Complete
<b>1997 WINTER FUNDING CYCLE</b>				
001-97	1	Elk Creek Channel Restoration	Watershed group	Complete
002-97	2	Fisher River Channel Restoration	Cons. District	Complete
003-97	3	Stinger Creek Channel Restoration	Cons. Foundation	Complete
004-97	4	Middle Fork Rock Creek Riparian Fence	USFS	Complete
005-97	5	Clark Fork River Riparian Fence	Landowner	Complete
006-97	6	Grantier Spring Creek Channel Restoration	Landowner	Complete

FFI#		PROJECT NUMBER, NAME & YEAR	APPLICANT	EXPECTED YEAR OF COMPLETION
007-97	7	Camp Creek Restoration	TU/Landowners	Complete (adds to 006-1999)
009-97	8	Chamberlain Creek Diversion	FWP/Landowner	Complete
010-97	9	O'Brien Creek Channel Restoration	FWP/Landowners	Complete
011-97	10	N. F. Blackfoot Hoxworth/Williams Fish Screen	FWP/Landowners	Complete
012-97	11	Monture Creek Fish Habitat Enhancement	FWP/Landowner	Complete
013-97	12	Salmon Creek & Dry Creek Habitat Restoration	FWP/Landowner	Complete
016-97	13	Stone Creek Channel Restoration	FWP/Landowner	Complete
017-97	14	Ruby River Channel Stabilization	FWP/Landowner	Complete
018-97	15	Mol Heron Creek Fish Screen - supplement	Landowner	Complete (adds to 021-96)
020-97	16	Black Butte Creek Riparian Fence & Stabilization	USFS/Landowner	Complete
021-97	17	Missouri River Bank Stabilization	TU/Landowner	Complete
022-97	18	Sun River Bank Stabilization Survey	Consult/Landowner	Complete
023-97	19	Elk Creek Bank Stabilization	Consult/Landowner	Complete
024-97	20	Big Spring Creek Restoration	FWP	Complete
026-97	21	Townsend Ranch Streams Restoration	USFS/Landowner	Complete
027-97	22	Bynum Reservoir Spawning Habitat	WU	Complete
028-97	23	Hauser Reservoir Spawning Habitat	WU	Complete
031-97	24	Fresno Reservoir Spawning Habitat	FWP	Complete
<b>1997 SUMMER FUNDING CYCLE</b>				
033-97	25	Yellowstone River Bank Stabilization	FWP/Landowner	Complete
034-97	26	Mud Creek Channel Restoration	Cons. Foundation	Complete
036-97	27	Rock Creek Channel Restoration	USFS	Complete
037-97	28	Cottonwood Creek Culvert to Bridge Conversion	FWP/County	Complete
038-97	29	McCabe Creek Culvert to Bridge Conversion	FWP/County	Complete
039-97	30	Johnson Creek Culvert to Bridge Conversion	FWP/Landowners	Complete
040-97	31	Gilbert & Shanley Creeks Project Repair	FWP/Landowners	Complete
045-97	32	Mill Coulee Bank Stabilization	Consult/Landowner	Complete
046-97	33	Sun River Channel Survey	Cons. Dist./Consult	Complete
047-97	34	Sun River Bank Stabilization	Consult/Landowner	Complete
050-97	35	Canyon Creek Channel Restoration	NRCS/Landowner	Complete
051-97	36	Boulder River Channel Stabilization	Consult/Landowner	Complete
052-97	37	Careless Creek Bank Stabilization	NRCS/Landowner	Complete
055-97	38	Muskat Creek Migration Barrier	FWP/USFS/BLM	Complete
056-97	39	Yellowstone River Bank Stabilization	FWP/Landowner	Complete
<b>1998 WINTER FUNDING CYCLE</b>				
001-98	1	Bear Paw Lake Shoreline Rearing Habitat	FWP	Complete
003-98	2	Beaverhead River Riparian Fencing	USFWS/Landowner	Complete
004-98	3	Big Creek Channel Restoration	Cons. Dist./Consult	Complete
006-98	4	Bynum Reservoir Spawning Habitat	WU	Complete
007-98	5	Canyon Ferry Reservoir Spawning Habitat	WU	Complete
010-98	6	Deep Creek Channel Restoration	FWP/Landowner	Complete
011-98	7	East Fork Bull River Bank Stabilization	FWP/Landowner	Complete
012-98	8	Highwood Creek Bank Stabilization	Consult/Landowner	Complete
013-98	9	Hughes Creek Channel Restoration	USFS	Complete
014-98	10	Kleinschmidt Creek Channel Restoration	Consult/Landowner	Complete
016-98	11	Missouri River Bank Stabilization	TU/Landowner	Complete
018a-98	12	Spring Creek Murphy Diversion Fish Passage	FWP/Landowner	Complete
018b-98	13	North Fork Blackfoot River Haggert Diversion	FWP/Landowner	Complete
018c-98	14	North Fork Blackfoot River Weaver Diversion	FWP/Landowner	Complete
018d-98	15	Blackfoot River Bank Stabilization	FWP/Landowner	Complete
026-98	16	Spring Coulee Riparian Fence & Stabilization	Consult/Landowners	Complete
<b>1998 SUMMER FUNDING CYCLE</b>				
027-98	17	Big Creek Flow Enhancement	Landowners	Complete
028-98	18	Bear Creek Channel Restoration	TU/Landowner	Complete
029-98	19	Blackfoot River Water Conservation	FWP/Landowner	Complete
030-98	20	Cottonwood & McCabe Cr. Bridges (supplement)	FWP/County	Complete
031-98	21	McCabe Creek Habitat Enhancement	FWP/Landowner	Complete
033-98	22	Nevada Creek Douglas & Helmville Fish Ladders	FWP/Landowner	Complete



FFI#		PROJECT NUMBER, NAME & YEAR	APPLICANT	EXPECTED YEAR OF COMPLETION
034-98	23	Nevada Creek Quigley Fish Ladder	FWP/Landowner	Complete
035-98	24	Nevada Creek Fish Friendly Diversion & Fence	FWP/Landowner	Complete
036-98	25	Nevada Spring Creek Culvert to Bridge Conversion	FWP/Landowner	Complete
037-98	26	Rock Creek Channel Restoration	TU/Landowner	Complete
038-98	27	Shanley Creek Diversion & Riparian Fence	FWP/Landowner	Complete
039-98	28	Wasson Creek Fish Friendly Diversion	FWP/Landowner	Complete
042-98	29	Careless Creek Bridge & Riparian Fence	NRCS/Landowners	Complete
045-98	30	Esp/Chamber Spring Creek Channel Restoration	CD/FWP/Owners	Complete
051-98	31	Ross Fork Rock Creek Fish Ladder	USFS	Complete
052-98	32	Saddle Brook Pond Restoration	WU	Complete
053-98	33	Shields River & Elk Creek Riparian Fence	CD/Watershed Grp.	Complete
054-98	34	Smith Creek Riparian Fence	Landowner	Complete
055-98	35	Spokane Creek Channel Restoration	USFWS/Landowner	Complete
056-98	36	Staubach Creek Fish Barrier	FWP	Complete
057-98	37	Sweetgrass Creek Riparian Fence	Landowner	Complete
059-98	38	Thompson Chain of Lakes Habitat Structures	Bassmasters	Complete
060-98	39	Tiber Reservoir Spawning Habitat	Sportsmen's Club	Complete
		<b>1999 WINTER FUNDING CYCLE</b>		
001-99	1	Big Hole River Stock Water	CD/FWP	Complete
002-99	2	Big Hole River Stock Water	Landowner/FWP	Complete
004-99	3	Butler Creek Fence and Stockwater	Landowner/FWP	Complete
005-99	4	Bynum Reservoir Spawning Habitat	WU	Complete
006-99	5	Camp Creek Channel Restoration	Consult/Landowner	Complete (adds to 007-97)
007-99	6	Coal Creek Riparian Fencing	DNRC	Complete
008-99	7	Cottonwood Creek Bank Stabilization	Landowner/CD	Complete
010-99	8	Douglas Creek Fish Passage	FWP	Complete
012-99	9	Elk Creek (Scherrer) Channel Restoration	Landowner/FWS	Complete
014-99	10	Horseshoe Lake Spawning Habitat	Bassmasters	Complete
018-99	11	Prickly Pear Creek Bank Stabilization	Consult/Landowner	Complete
020-99	12	Rock Creek Water Salvage & Channel Restoration	Landowner/FWP	Complete (supplemented by 015-01)
021-99	13	Ruby River Feedlot Relocation	Landowner/NRCS	Complete
023-99	14	Smith River Stock Water	Landowner/CD	Complete
024-99	15	Sun River Bank Stabilization	Consult/CD	Complete
025-99	16	Tenmile Creek Riparian Habitat	Watershed Group	Complete
026-99	17	Warren Creek Channel Restoration	USFWS	Complete
027-99	18	S. Fork Willow Creek Riparian Fence	Landowner/FWP	Complete
028-99	19	Yellowstone River Huntley Fish Passage	Irrigation District	Complete
		<b>1999 SUMMER FUNDING CYCLE</b>		
030-99	20	<b>Bad Canyon Creek Non-native Fish Removal</b>	<b>FWP</b>	<b>Complete</b>
031-99	21	Beaverhead/Poindexter Bank Stabilization	Landowner/FWP	Complete
033-99	22	<b>Big Coulee Creek Fish Barrier</b>	<b>FWP</b>	<b>Complete</b>
035-99	23	Canyon Ferry Reservoir Spawning Habitat	FWP	Complete
037-99	24	<b>Cottonwood Creek Fish Barrier</b>	<b>FWP</b>	<b>Complete</b>
038-99	25	<b>Cottonwood Creek Fish Ladder Repair</b>	<b>TU/FWP</b>	<b>Complete</b>
039-99	26	<b>Daisy Dean Creek Off-site Water and Fencing</b>	<b>CD/Watershed group</b>	<b>Complete</b>
041-99	27	Elk Creek (Artz) Channel Restoration	Landowner/FWS	Complete
042-99	28	<b>Grave Cr Diversion Repair and Fish Screen</b>	<b>CD/FWP</b>	<b>Complete</b>
045-99	29	Little Prickly Pear Cr. Fish Screen	FWP/Landowner	Complete
047-99	30	Lost Creek Corral Relocation	Landowner/FWP	Complete
049-99	31	<b>Monture Creek Habitat Restoration</b>	<b>TU/Landowner</b>	<b>Complete</b>
050-99	32	Ninemile Creek Bank Stabilization & Fencing	Landowner	Complete
051-99	33	O'Brien Creek Grade Control Repair	FWP	Complete
052-99	34	<b>Pearson Creek Habitat Restoration</b>	<b>TU/Landowner</b>	<b>Complete</b>



FFI#		PROJECT NUMBER, NAME & YEAR	APPLICANT	EXPECTED YEAR OF COMPLETION
053-99	35	<i>Prospect Creek Channel Restoration</i>	<i>Watershed group</i>	<i>Complete</i>
054-99	36	Racetrack Creek Riparian Fence & Channel Restoration	Landowner/FWP	Complete
057-99	37	Ronan Spring Cr. Channel Restoration	Community Found.	Complete
058-99	38	Salmo Reservoir Lake Aeration	FWP	Complete
059-99	39	Shields River Bank Stabilization	CD	Complete
060-99	40	Shields River Bank Stabilization	CD	Complete
061-99	41	S. Fk. Smith River Off-Site Water & Fence	Landowner/CD	Complete
063-99	42	<i>Spring Creek Fish Barrier</i>	<i>FWP/Landowner</i>	<i>Complete</i>
066-99	43	Staubach Creek Native Fish Protection	FWP/Landowner	Complete
		<b>2000 WINTER FUNDING CYCLE</b>		
002-00	1	Basin Creek Culvert Replacement	CT Foundation	Complete
004-00	2	Upper Big Hole River Offstream Water	Big Hole Watershed	Complete
005-00	3	Bitterroot River Riparian Fence	Landowner	Complete
007-00	4	Bynum Reservoir Spawning Habitat	Walleye Unlimited	Complete
008-00	5	Canyon Creek Riparian Fence	Landowner	Complete
009-00	6	Cottonwood Creek Channel Restoration	NRCS/Landowner	Complete
010-00	7	<i>Cottonwood Creek Fish Barrier</i>	<i>USFS</i>	<i>Complete</i>
012-00	8	Dupuyer Creek Channel Restoration	USFWS/Landowner	Complete
013-00	9	East Fork Bull River Channel Restoration	Landowner	Complete
015-00	10	Flint Creek Off-site Water and Riparian Fencing	FWP/Landowner	Complete
017-00	11	Lost Creek Headgate Repair & Channel Restoration	FWP/Landowner	Complete
018-00	12	<i>McCabe Creek Irrigation Efficiency</i>	<i>USFWS</i>	<i>Complete</i>
023-00	13	Prickly Pear Creek Channel Restoration	FWP/Landowner	Complete
024-00	14	<i>Prospect Creek Channel Restoration</i>	<i>Watershed group</i>	<i>Complete</i>
027-00	15	Ruby Creek Flow Enhancement	USFWS/Landowner	Complete
028-00	16	S.F. Musselshell River Fish Passage	DNRC	Complete
030-00	17	Stillwater River Side Channel Restoration	Landowner	Complete
031-00	18	Sun River Channel Restoration	Consultant	Complete
032-00	19	Sweathouse Creek Fish Screen	FWP/Landowner	Complete
033-00	20	Tenmile Creek Riparian Restoration	Watershed Group	Complete
035-00	21	Virginia Creek Channel Restoration	Landowner	Complete
036-00	22	Warren Creek Channel Restoration	FWP	Complete
037-00	23	<i>West Fork Wilson Creek Fish Barrier</i>	<i>FWP</i>	<i>Complete</i>
038-00	24	Yellowstone River Riparian Restoration	Consultant	Complete
		<b>2000 SUMMER FUNDING CYCLE</b>		
041-00	25	Big Creek Fish Screen	Landowner	Complete
042-00	26	<i>Bitterroot River Fish Screen</i>	<i>Ditch Company</i>	<i>Complete (adds to 033-2002)</i>
043-00	27	<i>Butler Creek Fish Passage</i>	<i>FWP</i>	<i>Complete</i>
044-00	28	Canyon Ferry Perch Spawning Habitat	FWP	Complete
045-00	29	<i>Dempsey Creek Corral Relocation</i>	<i>Cons. District</i>	<i>Complete</i>
046-00	30	Kolb Spring Creek Channel Restoration & Fencing	FWP/Landowner	Complete
051-00	31	<i>O'Brien Creek Riparian Fencing</i>	<i>FWP</i>	<i>Complete</i>
052-00	32	Poorman Creek Channel Restoration	Consultant	Complete
053-00	33	Silver Butte Fisher Creek Bank Stabilization	NRCS	Complete
056-00	34	Tongue River Riparian Fencing	FWP/Landowner	Complete
058-00	35	Wolf Creek Fish Passage	FWP	Complete
059-00	36	Region 6 Pond Aeration	FWP	Complete
		<b>2001 WINTER FUNDING CYCLE</b>		
005-01	1	Dunkleberg Creek Habitat Enhancement	Landowner/TU	Complete
006-01	2	Elk Creek Channel Restoration	USFWS/Landowner	Complete
007-01	3	Hauser Reservoir Perch Spawning Habitat	FWP	Complete
008-01	4	<i>Marshall and Deer Creeks Fish Screens</i>	<i>FWP</i>	<i>Complete</i>
009-01	5	<i>Mill Creek Culvert Replacement</i>	<i>Landowners</i>	<i>Complete (adds to 020-04)</i>
010-01	6	Missouri River Riparian Restoration	Landowner/TU	Complete

FFI#		PROJECT NUMBER, NAME & YEAR	APPLICANT	EXPECTED YEAR OF COMPLETION
011-01	7	Pintlar Creek Flow Enhancement	USFWS	Complete
012-01	8	Poorman Creek Flow Enhancement	TU/FWP	Complete (adds to 047-2002)
013-01	9	Rattlesnake Creek Side Channel Stabilization	Landowner	Complete
014-01	10	Rock Creek Channel Restoration	TU/Landowner	Complete
015-01	11	Rock Creek Supplemental Funding	FWP/Landowner	Complete (adds to 020-99)
016-01	12	Shields River Bank Stabilization	DNRC	Complete
017-01	13	Sixmile Creek Diversion Repair	FWP/Landowners	Complete
020-01	14	Teton River Diversion Stabilization	Watershed group	Complete
022-01	15	White Pine Creek Channel Stabilization	Watershed Group	Complete
023-01	16	Non-native Fish Removal	FWP	Complete
		2001 SPECIAL DROUGHT FUNDING CYCLE		
024-01	17	Big Hole River Soil Moisture Meters	Watershed Group	Complete
025-01	18	Blackfoot River Soil Moisture Meters	Watershed Group	Complete
028-01	19	Locke Creek Irrigation Conversion and Lease	FWP/Landowner	Complete
		2001 SUMMER FUNDING CYCLE		
031-01	20	Antelope Creek Riparian Fence	Landowner/FWP	Complete
032-01	21	Antelope Creek riparian fence and off-site water	Landowner/FWP	Complete
034-01	22	Bitterroot River Riparian Fence	Landowner	Complete
035-01	23	Big Otter Creek Corral Relocation	Landowner	Complete
037-01	24	Boulder River Fish Ladder	Trout Unlimited	Complete
039-01	25	Dunham Creek Channel Restoration	FWP	Complete
042-01	26	Nevada Spring Creek Channel Restoration	Landowner/consultant	Complete
049-01	27	Region 6 Pond aeration	FWP	Complete
		2002 WINTER FUNDING CYCLE		
001-02	1	Alderman Spring Creek channel restoration	Landowner/ Consultant	Complete
002-02	2	Beaver Creek diversion repair	FWP	Complete
003-02	3	Beaver Creek channel restoration	FWP	Complete
004-02	4	Big Timber Creek channel stabilization	Landowner/ Consultant	Complete
005-02	5	Canyon Ferry perch spawning habitat	FWP	Complete
006-02	6	Chicken Creek flume installation	Landowner/FWP	Complete
007-02	7	Cottonwood Creek off-stream livestock water	State forest	Complete
008-02	8	East Boulder River off-stream livestock water	Watershed Group	Complete
009-02	9	Elk Creek spring corral bypass	Cons. District/ Landowner	Complete
011-02	10	Esp-Chambers Spring Creek off-stream water repair	FWP	Complete
012-02	11	Harvey Creek channel restoration	FWP	Complete
013-02	12	Hauser Reservoir perch spawning habitat	FWP	Complete
014-02	13	Jefferson irrigation overflow fish migration barrier	Trout Unlimited	Complete
015-02	14	Madison Spring Creek channel restoration	Trout Unlimited	Complete
016-02	15	Mathew Bird Creek bank stabilization	Gallatin Land Trust	Complete
021-02	16	Rattlesnake Creek fish ladder	Trout Unlimited	Complete
022-02	17	Rattlesnake Creek fish screens	FWP	Complete
024-02	18	Sappington Spring Creek spawning channel	Trout Unlimited	Complete
027-02	19	Stone Creek channel restoration	Cons. District	Complete
028-02	20	Ninemile Creek riparian fencing	Landowner/ Trout Unlimited	Complete
		2002 SPECIAL DROUGHT FUNDING CYCLE		
030-02	21	Jefferson River ditch sealing	Trout Unlimited	Complete
		2002 SUMMER FUNDING CYCLE		
033-02	22	Bitterroot River Republican Ditch fish screen	FWP	Complete/ ongoing maintenance (supplemented by 042-2000)

FFI#		PROJECT NUMBER, NAME & YEAR	APPLICANT	EXPECTED YEAR OF COMPLETION
034-02	23	Blackfoot River water salvage - stockwater well	Landowner	Complete
035-02	24	Blanchard Creek riparian fence	DNRC	Complete
036-02	25	Cedar Creek water lease	Landowner/FWP	Complete
039-02	26	East Gallatin River bank stabilization	FWP	Complete
040-02	27	German Gulch channel restoration	TU/FWP	Complete (reduced scale)
041-02	28	Locke Creek fish passage	GYC	Complete
042-02	29	Marias River habitat enhancement	Sportsmen group	Complete
043-02	30	Marshall Creek woody debris recruitment	FWP	Complete
045-02	31	Missouri River bank stabilization repair	FWP/Landowner	Complete
047-02	32	Poorman Creek water salvage and diversion repair	TU	Complete (adds to 012-01)
048-02	33	Skalkaho Creek fish screens	FWP	Complete/ongoing maintenance
050-02	34	R-6 Ponds aeration	FWP	Complete
		<b>2003 WINTER FUNDING CYCLE</b>		
002-03	1	Brackett Creek channel stabilization	Landowner/consultant	Complete
003-03	2	Canyon Ferry perch spawning habitat	FWP	Complete
004-03	3	Cottonwood Creek fish passage	FWP	Complete
007-03	4	Dupuyer Creek channel stabilization	Landowner/FWP	Complete
008-03	5	Elkhorn tributaries non-native fish removal	FWP	Complete
009-03	6	Hauser Reservoir perch spawning habitat	FWP	Complete
010-03	7	Laird Creek channel stabilization	Landowner	Complete
012-03	8	Lost Creek channel restoration	FWP	Complete
013-03	9	Marshall Creek fish passage	FWP	Complete
016-03	10	Middle Fork Rock Creek riparian fencing	USFS	Complete
017-03	11	Mill Creek channel restoration	Watershed group/NRCS	Complete
018-03	12	McKee Spring Creek channel restoration	Consultant/Landowner	Complete
019-03	13	Nevada Spring Creek channel restoration	Consultant/Landowner	Complete
020-03	14	Poorman Creek fish passage	Consultant/Landowner	Complete
024-03	15	Skalkaho Creek Hedge canal siphon	FWP	2009
025-03	16	Skalkaho Creek Republican canal siphon	FWP	2009
026-03	17	South Fork Bull River channel stabilization	Watershed group	Complete
027-03	18	South Fork Judith River fish passage barrier	FWP	Complete (supplemented by 016-06)
028-03	19	Thompson River riparian restoration	Plum Creek Timber	Complete
029-03	20	Upper Willow Creek channel restoration	FWP	Complete
		<b>2003 SPECIAL DROUGHT FUNDING CYCLE</b>		
030-03	21	Jefferson River ditch sealing	Trout Unlimited	Complete
032-03	22	Sun River ditch sealing	FWP	Complete
		<b>2003 SUMMER FUNDING CYCLE</b>		
036-03	23	Clark Fork River riparian fencing	Landowner	Complete
037-03	24	Deep Creek riparian fencing and off site water	FWP/Landowner	Complete
039-03	25	East Fork Yaak River / Solo Joe Creek fish passage and road stabilization	Watershed group	Complete
042-03	26	Lost Creek channel restoration	FWP	Complete
043-03	27	Marshall Creek riparian fencing	FWP/Landowner	Complete
045-03	28	Mill Creek riparian fencing	Land trust	Complete
047-03	29	North Fork Fridley Creek fish passage and water salvage	Landowner	Complete
048-03	30	North Fork Horse Creek riparian fencing and off site water	Landowner	Complete



FFI#		PROJECT NUMBER, NAME & YEAR	APPLICANT	EXPECTED YEAR OF COMPLETION
051-03	31	Shields River channel stabilization	Conservation district	Complete
053-03	32	Tenmile Creek channel stabilization	County water quality district	Complete
		<b>2004 WINTER FUNDING CYCLE</b>		
003-04	1	Canyon Ferry Reservoir perch spawning habitat	FWP	Complete
004-04	2	Chicken Creek riparian fencing and offsite water	Landowner/FWP	Complete
005-04	3	Clear Creek culvert fish passage	FWP	Complete (supplemented by 005-05)
006-04	4	Deep Creek bank stabilization repair	Cons. District	Complete
007-04	5	Deep Creek off channel livestock water	FWP	Complete
008-04	6	Duck Creek culvert fish passage	FWP	Complete
009-04	7	<b>Emigrant Spring Creek channel restoration</b>	<b>FWP/Landowner</b>	<b>Complete</b>
010-04	8	Fishtrap Creek pool habitat enhancement	FWP	Complete
013-04	9	Little Prickly Pear Creek (Sentinel Rock) instream flow enhancement	FWP/Landowner	Complete
014-04	10	Little Prickly Pear Creek (Rocking Z) riparian fencing	FWP/Landowner	2009
020-04	11	<b>Mill Creek culvert fish passage supplement</b>	<b>FWP</b>	<b>Complete (adds to 09-01)</b>
021-04	12	Missouri River riparian plantings	FWP	Complete
022-04	13	<b>North Fork Horse Creek fish passage and flow enhancement</b>	<b>Landowner</b>	<b>Complete</b>
023-04	14	<b>Otie Reservoir riparian fencing and offsite water</b>	<b>FWP</b>	<b>Complete</b>
024-04	15	Pattee Creek channel re-naturalization	Montana Trout	Complete
026-04	16	Steel Creek riparian fencing	FWP	Complete
028-04	17	Tiber Reservoir perch spawning habitat	Local angler	Complete
029-04	18	Tiber Reservoir perch spawning habitat	Great Falls Walleye Unlimited	Complete
030-04	19	Tongue River T&Y diversion fish passage	FWP	Complete
031-04	20	Uncle George Creek riparian fencing and offsite water	USFS	Complete
033-04	21	Willow Creek riparian restoration	Bitterroot Land Trust	Complete
034-04	22	Willow Springs Creek spawning habitat enhancement	Trout Unlimited	Complete
		<b>2004 SPECIAL DROUGHT FUNDING CYCLE</b>		
035-04	23	Boulder River stock water well	Trout Unlimited	Complete
		<b>2004 SUMMER FUNDING CYCLE</b>		
037-04	24	<b>Blackfoot River drainage fish screen maintenance</b>	<b>FWP</b>	<b>2009</b>
038-04	25	<b>Blackfoot/Clearwater rivers irrigation efficiency</b>	<b>FWP</b>	<b>Complete</b>
041-04	26	<b>Dry Creek diversion replacement for fish passage</b>	<b>FWP</b>	<b>Complete</b>
044-04	27	Missouri River riparian restoration and fencing	Trout Unlimited/FWP	2009
045-04	28	<b>North Fork Horse Creek irrigation efficiency and water salvage</b>	<b>Landowner</b>	<b>Complete</b>
046-04	29	<b>Therriault Creek channel restoration</b>	<b>Watershed group</b>	<b>Complete</b>
047-04	30	<b>Tyler Creek riparian fencing</b>	<b>Land trust</b>	<b>Complete</b>
048-04	31	<b>Soda Butte Creek brook trout removal</b>	<b>FWP</b>	<b>Complete</b>
		<b>2005 WINTER FUNDING CYCLE</b>		
001-05	1	Antelope Creek channel restoration	Consultant/Landowner	Complete
002-05	2	<b>Ashby Creek channel restoration</b>	<b>Land trust/Landowner</b>	<b>Complete</b>
003-05	3	<b>Bad Canyon Creek barrier repair</b>	<b>FWP</b>	<b>Complete</b>
004-05	4	Big Hole River fish ladders	FWP	Complete



FFI#		PROJECT NUMBER, NAME & YEAR	APPLICANT	EXPECTED YEAR OF COMPLETION
005-05	5	Clear Creek fish passage supplemental funding	FWP	Complete (Supplemented by 005-04)
006-05	6	Hamilton Slough spawning habitat enhancement	TU/Landowner	Complete
007-05	7	Jack Creek channel restoration	Consultant/Landowner	2009
008-05	8	LaMarche Creek pool enhancement	FWP	Complete
009-05	9	<b>LaValle Creek riparian fencing</b>	<b>Landowner</b>	<b>2009</b>
010-05	10	Little Blackfoot River bank stabilization	Landowner	Complete
012-05	11	Nelson/Dana spring creek channel restoration	Landowners	Complete
013-05	12	Parson's slough spawning habitat enhancement	TU	Complete
014-05	13	<b>Pilgrim Creek channel restoration</b>	<b>Watershed group</b>	<b>Complete</b>
016-05	14	Region 1 Lakes bass habitat structures	Bass club	Complete
017-05	15	Region 6 ponds aerator maintenance	FWP	Complete
018-05	16	Telegraph Creek riparian and channel restoration	Landowner/Consultant	Complete
019-05	17	Thompson River riparian enhancement	Plum Creek Timber	Complete
020-05	18	<b>Threemile Creek channel stabilization</b>	<b>Landowner/Consultant</b>	<b>Complete</b>
021-05	19	Tiber Reservoir perch spawning habitat	WU	Complete
022-05	20	Willow Creek channel restoration	Landowner	Complete
023-05	21	<b>Yellowstone tributaries fish screens</b>	<b>FWP</b>	<b>Complete</b>
		<b>2006 SPECIAL DROUGHT FUNDING CYCLE</b>	<b>No applications submitted</b>	
		<b>2005 SUMMER FUNDING CYCLE</b>		
024-05	22	<b>Arrastra Creek culvert replacement</b>	<b>TU</b>	<b>Complete</b>
025-05	23	Chicken Creek corral removal	Landowner	Complete
026-05	24	Damutzer Slough channel restoration	Landowner	Complete
030-05	25	<b>Jacobsen Spring Creek channel restoration</b>	<b>TU</b>	<b>Complete</b>
031-05	26	<b>Kleinschmidt Creek channel and riparian restoration</b>	<b>TU</b>	<b>Complete</b>
032-05	27	Magpie Creek fish passage	FWP	Complete
033-05	28	<b>Piney Creek pool enhancement</b>	<b>FWP</b>	<b>Complete</b>
		<b>2006 WINTER FUNDING CYCLE</b>		
002-06	1	<b>Cottonwood Creek culvert replacement</b>	<b>TU</b>	<b>Complete</b>
003-06	2	<b>Eustache Creek channel restoration</b>	<b>TU</b>	<b>Complete</b>
005-06	3	Little Belt Creek riparian fencing	FWP/Landowner	2009
006-06	4	Little Prickly Pear Creek irrigation efficiency	Landowner	Complete
010-06	5	Missouri River riparian enhancement	FWP	Complete
013-06	6	Rock Creek channel restoration	FWP	Complete
014-06	7	<b>Sage Creek native fish barrier</b>	<b>FWP</b>	<b>2009</b>
015-06	8	<b>Salmon/Rock creeks riparian restoration</b>	<b>Land Trust</b>	<b>Complete</b>
016-06	9	<b>South Fork Judith River fish passage barrier supplement</b>	<b>FWP</b>	<b>Complete (supplement to 027-03)</b>
017-06	10	Teton River bank stabilization	FWP	Complete
019-06	11	<b>Upper Willow Creek riparian fencing</b>	<b>Land Trust</b>	<b>2009</b>
020-06	12	<b>Yellowstone tributaries fish screens supplement</b>	<b>FWP</b>	<b>2009</b>
		<b>2006 SUMMER FUNDING CYCLE</b>		
021-06	13	Beavertail and Frenchtown ponds woody debris	FWP	Complete
025-06	14	Box Elder Creek channel restoration	Landowner/consultant	2009
026-06	15	<b>Butler Creek riparian fencing</b>	<b>Landowner</b>	<b>2009</b>
027-06	16	<b>Crooked Creek fish barrier</b>	<b>FWP</b>	<b>Complete</b>
029-06	17	<b>Elk Creek bank stabilization and riparian enhancement</b>	<b>Landowner/FWP</b>	<b>2009</b>
030-06	18	Fish Creek channel restoration	TU	Complete
031-06	19	Fishtail Creek corral relocation	Stock association	2009
032-06	20	<b>Meadow Creek culvert to bridge conversion</b>	<b>USFS</b>	<b>Complete</b>
033-06	21	<b>Midas Creek culvert replacement</b>	<b>Montana Trout</b>	<b>Complete</b>
034-06	22	Ninemile Creek fish screen	Landowner/NRCS	2009

FFI#		PROJECT NUMBER, NAME & YEAR	APPLICANT	EXPECTED YEAR OF COMPLETION
036-06	23	Poorman Creek culvert to bridge conversion	TU	Complete
037-06	24	Ruby River/Lazyman Creek bank stabilization and riparian enhancement	Watershed group	Complete
039-06	25	Skalkaho Creek Hedge siphon supplement	FWP	2009
040-06	26	Skalkaho Creek Republican siphon supplement	FWP	2009
041-06	27	Threemile Creek channel and riparian restoration	Watershed group	2008
042-06	28	Trail Creek channel restoration	Consultant	2008
044-06	29	Tiber Reservoir xmas tree perch habitat	FWP	Complete
045-06	30	Wheelbarrow Creek bank stabilization and riparian restoration	Watershed group	Complete
046-06	31	Volney Creek corral relocation	Landowner/Stock Assoc.	2009
		<b>2007 WINTER FUNDING CYCLE</b>		
001-07	1	Big Hole River riparian restoration	USFWS	Complete
002-07	2	Big Hole River riparian fencing	FWP	Complete
003-07	3	Big Hole River stockwater wells	USFWS	Complete
004-07	4	Blacktail Creek flood mitigation	Beaverhead County	2009
005-07	5	Collar Gulch channel stabilization	FWP	Complete
006-07	6	Dick Creek fish screen	TU	Complete
007-07	7	Goose Creek brook trout removal	FWP	Complete
008-07	8	Governor Creek culvert to bridge conversion	USFWS	2009
009-07	9	Graves Creek habitat & riparian enhancement	Watershed group	2009
010-07	10	Jacobsen Spring Creek channel restoration	TU	Complete
011-07	11	Lake Creek fish barrier	FWP	2009
012-07	12	Lincoln Spring Creek channel restoration	TU	Complete
013-07	13	Little Blackfoot River enhancement	Conservation district	2009
014-07	14	Lolo Creek tributaries culvert replacements	Montana Trout	2009
016-07	15	Poorman Creek culvert to bridge conversion	TU	2009
017-07	16	Prairie Creek riparian fencing and culvert replace	DNRC	Complete
018-07	17	South Fork Ross Creek habitat enhancement	Landowner	Complete
019-07	18	Spring Creek culvert replacement	Conservation district	Complete
021-07	19	Theil Creek fish barrier	FWP	Complete
022-07	20	Thompson Creek riparian fencing	MSU	Complete
023-07	21	Yellowstone tribs. screens & ladder supplement	FWP	2009
		<b>2007 SUMMER FUNDING CYCLE</b>		
026-07	22	Big Hole River Harrington riparian fencing	FWP	2009
027-07	23	Big Hole River Huntley diversion restoration	FWP	2009
028-07	24	Big Hole River Christiansen riparian fencing	FWP	Complete
029-07	25	Cottonwood Creek riparian fencing	TU	2009
030-07	26	Fish Creek Klos channel restoration	TU	Complete
031-07	27	Lamarche Creek stockwater well	FWP	2009
032-07	28	Murphy Spring Creek fish screen	TU	Complete
033-07	29	Rock Creek pool enhancement	Landowner	2009
034-07	30	Rock Creek ford to culvert conversion	TU	Complete
035-07	31	Rock/Big Lake creeks fish ladders	FWP	2009
036-07	32	SF Big Swamp Creek channel restoration	USFWS	Complete
037-07	33	Swamp Creek riparian fencing	FWP	2009
038-07	34	Threemile Creek channel stabilization	Watershed group	2009
039-07	35	Tiber Reservoir perch habitat	FWP	Complete
042-07	36	Whites Gulch fish barrier	FWP	2009
		<b>2008 WINTER FUNDING CYCLE</b>		
001-08	1	Blackfoot River cross fencing	TU	2009
002-08	2	Brackett Creek bank stabilization	FWP	2009
003-08	3	Cedar Creek instream water right purchase	FWP	Complete
004-08	4	Cottonwood Creek diversion improvement	FWP	2009
005-08	5	Dunham Creek riparian enhancement	TU	2008

FFI#		PROJECT NUMBER, NAME & YEAR	APPLICANT	EXPECTED YEAR OF COMPLETION
006-08	6	East Fk Bull River channel stabilization	Watershed group	2009
007-08	7	East Fk Rock Creek riparian fencing	Land Trust	2009
008-08	8	Elk creek riparian fence and off-site water	TU	2009
009-08	9	Enders Spring Creek channel restoration	TU	2009
010-08	10	Gold Creek irrigation efficiency	Watershed group	2008
012-08	11	Locke Creek fish passage	FWP	2009
013-08	12	Meadow Creek culvert to bridge conversion	USFS	2008
014-08	13	Moose/Swamp creeks off-stream water	USFWS	2009
015-08	14	Morrell Creek fish passage and screens	TU	2009
016-08	15	North FK Highwood Creek fish barrier	FWP	2009
017-08	16	Prickly Pear Creek instream flow enhancement	Water Trust	Complete
018-08	17	Thompson River riparian enhancement	Consultant	Complete
019-08	18	York Gulch riparian fence & irrigation efficiency	USFWS	2008
		<b>2008 SUMMER FUNDING CYCLE</b>		
020-08	19	Beaver Creek culvert to bridge conversion	FWP	2009
021-08	20	Cramer Creek channel restoration	Landowner	2009
022-08	21	Fish Creek (Hanson) channel restoration	TU	2009
023-08	22	Deer Creek culvert replacement	FWP	2009
024-08	23	North Fk Smith River riparian fencing	FWP	2009
025-08	24	Snowbank Creek diversion modification	TU	2009
028-08	25	Wheelbarrow Creek livestock water gaps	Landowner	2009
029-08	26	Whites Gulch fish barrier supplement	FWP	2009



**TABLE 4.** Future Fisheries Improvement Program expenditures and balances by Project and Funding source for the Report Period November 1, 2006 through October 31, 2008. Projects highlighted in bold are projects eligible for HB647 (RIT) funding because they restore habitat for bull trout and/or cutthroat trout

Proj Id	Status	Project Name	2003 RIT 02022 EI131	2005 RIT 02022 EI150	2007 RIT 02022 EI170	1999 RR 02149 EI90	2001 RR 02149 EI115	2003 RR 02149 EI131	1999 Gen Lic 02409 EI90	2001 Gen Lic 02409 EI115	2003 Gen Lic 02409 EI131	HB647 02410 3801	TOTAL EXPENDITURES FOR REPORT PERIOD	BALANCE OF COMMITTED FUNDS
027-1998	Ongoing	Big Creek Flow Enhancement				16,000.00							16,000.00	24,063.00
033-2002	Ongoing	Bitterroot River											0.00	12,274.00
040-2002	Complete	German Gulch Channel Restoration		15,000.00									15,000.00	
045-2002	Complete	Missouri River Bank Stabilization Repair		3,168.65				7,715.00					7,715.00	
048-2002	Ongoing	Stalkaho Creek Fish Screens				25,000.00							3,168.65	44,322.35
018-2003	Complete	McKee Spring Cr Channel Restoration											25,000.00	
024-2003	Ongoing	Stalkaho Cr. Hedge Canal Siphon	81,785.70										81,785.70	38,652.30
025-2003	Ongoing	Stalkaho Cr. Republican Canal Siphon	79,613.55										79,613.55	24,785.45
027-2003	Complete	S. Fk Judith River fish passage barrier	270.58										270.58	
034-2003*	Cancelled	Boulder River Fish Screen							-40,000.00				-40,000.00	
037-2003	Complete	Deep Creek Riparian fence				3,000.00							3,000.00	
047-2003	Complete	North Fridley Creek Fish Passage	1,000.00										1,000.00	
007-2004	Complete	Deep Creek off channel livestock water						3,250.00					3,250.00	
014-2004	Ongoing	Little Pricky Pear Riparian fencing				12,221.59							12,221.59	4,175.41
033-2004	Complete	Willow Creek riparian restoration				122.84							122.84	
035-2004	Complete	Boulder River stock water well				32,052.68							32,052.68	
037-2004	Ongoing	Blackfoot River drainage fish screen												
044-2004	Ongoing	Missouri River riparian restoration				11,192.22							11,192.22	9,497.00
002-2005	Complete	Ashby Creek Channel Restoration	5,000.00										5,000.00	878.63
007-2005	Pending	Jack Creek channel restoration											0.00	20,000.00
009-2005	Ongoing	LaValle Creek Riparian fencing											0.00	6,176.00
012-2005	Complete	Nelson/Dana Spring creek channel restoration							32,398.00		2,643.75		35,041.75	
013-2005	Complete	Parson's Slough spawning habitat enhancement				39,940.00							39,940.00	
014-2005	Complete	Pilgrim Creek Channel restoration		16,420.00									16,420.00	
016-2005	Complete	Region 1 Bass Habitat structures							2,067.00				2,067.00	
017-2005	Complete	R-6 Pond Aerator maintenance				1,023.41							1,023.41	
018-2005	Complete	Telegraph Creek riparian & channel restoration				7,867.50							7,867.50	
023-2005	Complete	Yellowstone Tributaries fish screens		38,095.87									38,095.87	
030-2005	Complete	Jacobson Spring Cr channel restoration		39,451.50									39,451.50	
031-2005	Complete	Kleinschmidt Cr channel & riparian restoration		7,780.00									7,780.00	
002-2006	Complete	Cottonwood Creek culvert replacement		15,000.00									15,000.00	
003-2006	Complete	Eustache Creek channel restoration		8,255.06									8,255.06	
005-2006	Pending	Little Belt Creek riparian fencing											0.00	10,963.00
013-2006	Complete	Rock Creek channel restoration					99,000.00						99,000.00	
014-2006	Pending	Sage Creek native fish barrier											0.00	8,000.00
015-2006	Complete	Salmon/Dry & Rock Cr. riparian restoration		15,000.00									15,000.00	
016-2006	Complete	S. Fk. Judith River fish passage barrier		22,174.74									22,174.74	
019-2006	Ongoing	Upper Willow Crk riparian fencing		3,525.20									3,525.20	3,474.80
020-2006	Ongoing	Several Yellowstone tributaries fish screens		11,518.00									11,518.00	982.00
021-2006	Complete	Beavertail & Frenchtown Ponds woody debris						614.16					614.16	
025-2006	Ongoing	Box Elder Creek channel restoration				21,553.76							21,553.76	2,311.24
026-2006	Pending	Butler Creek riparian fence											0.00	3,694.00
027-2006	Complete	Crooked Creek fish barrier		85,000.00									85,000.00	
029-2006	Ongoing	Elk Creek channel stabilization		7,959.28									7,959.28	19,140.72
030-2006	Complete	Fish Creek channel restoration							64,123.00				64,123.00	
031-2006	Pending	Fishall Creek corral relocation											0.00	2,000.00
032-2006	Complete	Meadow Creek bridge		15,000.00									15,000.00	
033-2006	Complete	Midas Creek culvert replacement	10,166.00										10,166.00	
034-2006	Pending	Ninemile Creek fish screen		35,000.00									35,000.00	7,908.00
036-2006	Complete	Poorman Creek bridge											0.00	
037-2006	Complete	Ruby River channel enhancement					722.50	31,688.51	55,426.99				87,840.00	
039-2006	Pending	Stalkaho Creek/Hedge siphon											0.00	66,646.00



Proj Id	Status	Project Name	2003 RIT 02022 EI131	2005 RIT 02022 EI150	2007 RIT 02022 EI170	1999 RR 02149 EI90	2001 RR 02149 EI115	2003 RR 02149 EI131	1999 Gen Lic 02409 EI90	2001 Gen Lic 02409 EI115	2003 Gen Lic 02409 EI31	HB647 02410 38011	TOTAL EXPENDITURES FOR REPORT PERIOD	BALANCE OF COMMITTED FUNDS
040-2006	Pending	Skullaho Creek/Republican siphon											0.00	74,022.00
041-2006	Pending	Threemile Creek channel restoration											0.00	11,188.00
042-2006	Ongoing	Trail Creek/Yellowstone channel restoration		66,567.00									66,567.00	7,396.00
044-2006	Complete	Tiber Reservoir perch habitat				2,000.00							2,000.00	
045-2006	Complete	Upper Wheelbarrow Cr. Bank stabilization				11,585.84	19,426.16						30,992.00	
046-2006	Ongoing	Volney Creek corral relocation				12,500.00	4,217.15	12,798.82					17,015.87	1,984.03
001-2007	Complete	Big Hole Riparian restoration											12,500.00	
002-2007	Complete	Big Hole River riparian fencing				31,353.00							31,353.00	
003-2007	Complete	Big Hole Stockwater well				16,000.00							16,000.00	
004-2007	Pending	Blacktail Crk Flood mitigation											0.00	50,000.00
005-2007	Complete	Collar Gulch channel stabilization		19,783.00									19,783.00	
006-2007	Complete	Dick Creek fish screen		42,498.61					2,744.24				11,016.00	
007-2007	Complete	Goose Creek Brook trout removal				8,271.76							42,498.61	
008-2007	Pending	Governor Creek bridge											0.00	150,000.00
009-2007	Pending	Graves Creek habitat enhancement											0.00	20,000.00
010-2007	Complete	Jacobson Spring Cr channel restoration							24,025.00				24,025.00	
011-2007	Pending	Lake Creek fish barrier								52,000.00			0.00	23,746.00
012-2007	Complete	Lincoln Spring Cr channel restoration											52,000.00	
013-2007	Pending	Little Blackfoot habitat enhancement											0.00	24,450.00
014-2007	Pending	Lolo Creek trib. culvert replacements											0.00	45,000.00
016-2007	Pending	Poorman Creek Bridge											0.00	20,000.00
017-2007	Complete	Prairie Creek riparian fencing								22,946.00			22,946.00	
018-2007	Complete	S. Fork Ross Cr. habitat enhancement								20,000.00			20,000.00	
019-2007	Complete	Spring Creek culvert replacement		15,562.07		14,722.00							14,722.00	
021-2007	Complete	Thell Creek fish barrier							971.74	2,459.06			15,562.07	
022-2007	Complete	Thompson Creek riparian fencing											3,440.80	
023-2007	Pending	Yellowstone Trib fish screen											0.00	28,277.00
025-2007	Pending	Big Hole Hamington riparian fencing								34,160.00			0.00	8,000.00
027-2007	Pending	Big Hole Huntlay diversion restoration							15,680.00				15,680.00	
028-2007	Complete	Cottonwood Creek riparian fencing											0.00	12,800.00
029-2007	Complete	Big Hole Chintanson riparian fencing											0.00	
030-2007	Complete	Fish Creek Klos channel restoration								35,471.00			35,471.00	
031-2007	Pending	Lamarche Creek stockwater											0.00	6,895.00
032-2007	Complete	Murphy Spring Crk fish screen			1,142.48				30,579.00				30,579.00	
033-2007	Pending	Rock Creek pool enhancement											1,142.48	28,857.52
034-2007	Complete	Rock Creek culvert	6,400.00										6,400.00	
035-2007	Ongoing	Rock & Big Lake Cr fish ladder							5,230.00				5,230.00	1,576.00
036-2007	Complete	SF Big Swamp Crk channel restoration							24,842.50				24,842.50	
037-2007	Pending	Swamp Creek riparian fence											0.00	56,126.00
038-2007	Pending	Threemile Crk bank stabilization											0.00	8,507.00
039-2007	Complete	Tiber Reservoir perch habitat							2,000.00				2,000.00	
042-2007	Pending	Whites Gulch fish barrier											0.00	21,752.00
001-2008	Pending	Blackfoot River fencing											0.00	
002-2008	Pending	Bracket Creek bank stabilization											0.00	14,160.00
003-2008	Complete	Cedar Crk instream flow		37,500.00									37,500.00	
004-2008	Pending	Cottonwood Crk diversion modification											0.00	5,000.00
005-2008	Pending	Dunham Crk riparian enhancement											0.00	15,000.00
006-2008	Ongoing	E. FK Bull River channel stabilization		8,800.00									8,800.00	6,200.00
007-2008	Pending	E. FK Rock Crk riparian fence											0.00	14,980.00
008-2008	Pending	Elk Crk riparian fence											0.00	14,435.00
009-2008	Pending	Enders Spring Crk channel restoration											0.00	40,290.00
010-2008	Pending	Gold Crk irrigation efficiency											0.00	130,007.00
012-2008	Pending	Locke Crk fish passage											0.00	21,306.00
013-2008	Pending	Meadow Crk culvert to bridge											0.00	20,000.00
014-2008	Pending	Moose/Swamp Crks off stream water											0.00	5,625.00

Proj Id	Status	Project Name	2003 RIT 02022 EI131	2005 RIT 02022 EI150	2007 RIT 02022 EI170	1999 RR 02149 EI90	2001 RR 02149 EI115	2003 RR 02149 EI131	1999 Gen Lic 02409 EI90	2001 Gen Lic 02409 EI115	2003 Gen Lic 02409 EI31	HB647 02410 38011	TOTAL EXPENDITURES FOR REPORT PERIOD	BALANCE OF COMMITTED FUNDS
015-2008	Ongoing	Morrell Crk fish passage and screens	4,589.00										4,589.00	5,411.00
018-2008	Pending	N Frk Highwood Cr fish barrier											0.00	68,000.00
017-2008	Complete	Pickly Pear Crk flow enhancement								1,490.00			1,490.00	
018-2008	Complete	Thompson River riparian enhancement		6,825.00									6,825.00	
019-2008	Pending	York Gulch riparian fence											0.00	34,000.00
020-2008	Pending	Beaver Creek culvert to bridge											22,047.00	7,912.00
021-2008	Pending	W Frk Cramer Creek channel restoration												60,000.00
022-2008	Pending	Fish Creek Hanson channel restoration												24,885.00
023-2008	Pending	Deer Creek culvert replacement												23,500.00
024-2008	Pending	Smith River riparian fencing												28,045.00
025-2008	Pending	Snowbank Creek fish passage												4,645.00
028-2008	Pending	Wheelbarrow Creek livestock water gaps												6,162.00
029-2008	Pending	Whites Gulch fish barrier supplement												
TOTAL			188,824.83	535,883.98	1,142.48	266,386.60	123,365.81	56,066.49	220,089.47	134,376.06	2,643.75		1,528,779.47	1,534,640.45
73505**									-37,108.75				-37,108.75	
73848***			-21,332.50										-21,332.50	
73642		R2	11,393.50										11,393.50	
73643		R3	574.04										574.04	
73644		R4	1,243.98										1,243.98	
73645		R5	14,686.75										14,686.75	
Total Operations			27,898.27										27,898.27	
Cal & Dog		38642, 38645, 38646, 38647, 38651										103,989.67	103,989.67	
GRAND TOTAL			195,390.60	535,883.98	1,142.48	266,386.60	123,365.81	56,066.49	182,980.72	134,376.06	2,643.75		1,602,226.16	
		Nov - FYE 07	3,555.41	132,644.29		122,072.88	118,426.16	30,319.98	(2,643.75)	73,012.47	2,643.75	43,173.61	523,214.80	
		FY08	181,439.62	384,089.49	1,142.48	144,313.72	4,939.65	25,746.51	225,624.47	39,873.59		54,084.58	1,035,517.60	
		FY09 through Oct	10,385.57	19,150.20					(40,000.00)	21,490.00		6,721.48	43,493.76	
			195,390.60	535,883.98	1,142.48	266,386.60	123,365.81	56,066.49	182,980.72	134,376.06	2,643.75	103,989.67	1,602,226.16	

\*Refund for cancelled project

\*\* Charges in this org were moved to the correct FFI projects  
07BG164 moved expenditures made in July 2006 to FFI0122005 and FFI0162005

\*\*\* Charges were moved to the correct RIT project  
07BG141 moved exp made in July 2006 to RIT0302005

### Project Descriptions – 2007

*(italicized projects receive funding from HB647 because they restore habitat for bull trout and/or cutthroat trout)*

1. **Big Hole River Riparian Restoration.** The Big Hole River (Beaverhead County) is undergoing intensive conservation efforts to restore habitat for the last remaining population of fluvial arctic grayling in the lower 48 states. This project involved enhancing streamside willow communities along the main-stem Big Hole as it flows through property owned by Erb Livestock Inc. The project area is located immediately upstream of the Wisdom bridge. Containerized stock originating from Big Hole willow cuttings was used in this effort to treat about 7 miles of riverbank. **Completed.**
2. **Big Hole River Riparian Fencing.** The Big Hole River (Beaverhead County) supports the last remaining population of fluvial arctic grayling in the lower 48 states. This project involved riparian fencing along 2.7 miles of the Big Hole and 0.5 miles of Bryant Creek, off-stream water development, and installation of water measuring devices to improve management of diversions. **Completed.**
3. **Big Hole River Stock Water Wells.** The importance of the Big Hole River (Beaverhead County) to fluvial arctic grayling is described above. Dewatering during the late summer months is perhaps the most important factor limiting fish populations in the river. This project involved replacement of late season stock-watering from ditches, located on tributaries to the Big Hole, with wells that remain operational year-round. These projects eliminated the need to divert water for cattle late into the fall and improved stream flow on 5 miles of Fish Trap Creek, 2.5 miles of Berry Creek, and 1.2 miles of Deep Creek. **Completed.**
4. **Blacktail Deer Creek Enhancement.** Blacktail Deer Creek (Beaverhead County) supports a mixed salmonid population. Portions of the stream that flow through the city limits of Dillon have been impacted by installation of undersized culverts. This project will replace two undersized culverts with free span bridges that will increase flood capacity, re-establish stream gradient, and eliminate the typical problems associated with channel constrictions. Approximately 2,200 ft of stream will benefit. **Pending.**
5. **Collar Gulch Channel Restoration.** Collar Gulch (Fergus County) supports an important isolated population of westslope cutthroat trout. **The gulch was historically mined** and a remnant crib diversion dam was beginning to fail. Failure of this diversion would have resulted in formation of a headcut that would have deteriorated habitat for this important population. This project involved relocating the reach of stream that flowed over the dam and construction of six step pools to stabilize the grade. **Completed.**



6. **Dick Creek Fish Screen.** Dick Creek (Powell County) is a highly important tributary to the Blackfoot River that supports small numbers of genetically pure westslope cutthroat trout. An unregulated irrigation ditch, located five miles upstream from the mouth, entrained cutthroat as well as other fishes. This project involved installation of a fish screen and headgate on the ditch. **Completed.**
7. **Goose Creek Non-Native Removal.** Goose Creek (Park County) and surrounding lakes support important populations of Yellowstone cutthroat trout. This project involved chemical treatment of about 6 miles of Goose Creek as well as three surrounding lakes to eliminate competition from brook trout. **Completed.**
8. **Governor Creek Fish Passage Enhancement.** Governor Creek (Beaverhead County) is a third order tributary to the upper Big Hole River. Undersized twin culverts are presently a partial barrier to grayling passage during the spawning season. This project would replace the twin culverts with a concrete bridge and open up 15 miles of Governor Creek to grayling spawning. **Pending.**
9. **Graves Creek Channel Enhancement.** Graves Creek (Sanders County) has been identified as an important bull trout stream and also supports westslope cutthroat trout. Portions of the channel have been degraded due to past logging practices and flooding. This project would restore selected reaches of the stream. Treatments include repairing an eroding terrace, and installing woody debris jams to increase pool habitat and channel complexity. **Pending.**
10. **Jacobsen Spring Creek Channel Restoration.** Jacobsen Spring Creek (Powell County) is an important tributary to the North Fork of the Blackfoot River. The headwater reach became over-widened, shallow and sediment laden due to previous grazing practices. This project involved reconstruction of about 1 mile of stream and complements an earlier project completed just downstream. Treatments included narrowing and deepening the channel, increasing channel sinuosity, and placement of sod mats on stream banks and woody debris in the channel. Grazing of streamside areas will be managed to protect the investment in restoration. **Completed.**
11. **Lake Creek Non-Native Fish Barrier.** Lake Creek (Meagher County), a tributary to the Smith River, presently supports a non-native fish assemblage. This project involves construction of a gabion barrier on Lake Creek, removal of all fishes presently in the drainage, which includes Crater Lake, and reintroduction of native westslope cutthroat trout. The project will increase the present range of this important native fish. **Pending.**
12. **Lincoln Spring Creek Channel Restoration.** Lincoln Spring Creek (Lewis and Clark County) is a tributary to Keep Cool Creek in the upper Blackfoot watershed. The stream had been degraded from livestock grazing, undersized culverts, and other land use practices in the area. This project restored approximately 9,000 ft of spring creek. Treatments included narrowing and



deepening the channel, increasing sinuosity, placement of woody debris to increase habitat complexity, installation of sod mats on stream banks to improve stability, and removal and replacement of three undersized culverts. Grazing will be managed to protect the investment in restoration. **Completed.**

13. **Little Blackfoot River Enhancement.** The Little Blackfoot River (Powell County) is an important tributary to the upper Clark Fork River. The Little Blackfoot supports a mixed salmonid assemblage and is extremely popular with local anglers. Portions of the stream have been damaged by previous grazing practices and channelization. This project would restore the 2.6 miles reach of stream located just upstream from Highway 12. Treatments include: 4,300 ft of riparian fencing, installation of 50 habitat improvement structures, stabilizing 2,300 ft of bank using natural materials, replanting of riparian vegetation, and some channel changes to simulate a more natural geometry. Weed control and monitoring are also part of the project plan. **Pending.**
14. **Lolo Creek Culvert Replacements.** Lolo Creek (Missoula County), tributary to the Bitterroot River, supports a mixed salmonid assemblage, including bull trout and cutthroat trout. Movement into spawning tributaries is impaired by several undersized culverts. This project involves replacement of 5 culverts that have been identified as among the most important barriers to remove. **Pending.**
15. **Poorman Creek Fish Passage Enhancement.** Poorman Creek (Lewis and Clark County) is a highly important tributary located in the upper Blackfoot River watershed. Poorman Creek is a bull trout spawning stream and also supports genetically pure westslope cutthroat trout. Culverts on a road crossing located about 2.8 miles upstream from the mouth presently act as a barrier to fish migration. This project would replace these culverts with a full span bridge. **Pending.**
16. **Prairie and Andrews Creeks Riparian Fencing.** Prairie and Andrews creeks (Ravalli County) support both resident and fluvial westslope cutthroat trout. Grazing had impacted both streams. Additionally, undersized culverts on both streams impeded migration. This project included riparian fencing that excludes 0.7 miles of Prairie Creek and 0.5 miles of Andrews Creek from grazing. One culvert on each stream also was replaced with a larger, embedded culvert to improve connectivity. **Completed.**
17. **South Fork Ross Creek Enhancement.** South Fork Ross Creek (Gallatin County), a secondary tributary to Smith Creek, supports a mixed salmonid fishery. This project, located entirely on private property, involved restoration of 1,430 ft of Ross Creek and 1,000 ft of a spring. **Completed.**
18. **Spring Creek Culvert Replacement.** Spring Creek (Madison County) is a tributary to the Beaverhead River near Beaverhead Rock. A culvert, located 0.3 miles upstream from the confluence, was undersized and a barrier to fish

migration. This project involved replacing a 48-inch culvert with an 83-inch X 128 inch squash culvert. **Completed.**

19. ***Theil Creek Non-Native Fish Barrier.*** Theil Creek (Carbon County), located NE of Red Lodge, was selected as a refuge stream for genetically pure Yellowstone cutthroat trout. Brook trout were removed from the stream above a natural temporary barrier. This project involved construction of a permanent barrier on Theil Creek. The stream is now used to sustain Yellowstone cutthroat from nearby streams that were damaged during the Derby Mountain fire. **Completed.**
20. ***Thompson Spring Creek Riparian Fencing.*** Thompson Creek (Gallatin County) supports a mixed population of salmonids and, in a restored condition, could become an important spawning stream for Gallatin and East Gallatin River fishes. Grazing had impacted portions of the stream flowing through the Taylor and Heath properties. This project installed riparian fencing and armored stanchion water gaps to improve streamside grazing management along 0.83 miles of stream. **Completed.**
21. ***Yellowstone Tributary Fish Screens.*** The upper Yellowstone River drainage (Park County) is home to the most important remaining populations of Yellowstone cutthroat trout in North America. Three tributaries, Big Creek, South Fork Fridley Creek, and Mol Heron Creek support spawning runs of Yellowstone cutthroat but irrigation diversions presently entrain spawning adults as well as newly out-migrating fry and fingerling from all of these streams. Fish screens have been designed to fit irrigation diversions located on Big and Mol Heron creeks and a fish ladder has been designed for installation on South Fork Fridley Creek. These projects have received previous program funding. However, because costs have continued to increase in recent months, these projects remain under-funded. This proposal is for supplemental funding. **Ongoing.**
22. ***Big Hole River Riparian Fencing.*** See background information presented in Projects 1 and 2. This project, located near the town of Wisdom, involves installation of about 4.0 miles of riparian fencing and 1.0 mile of cross fencing that will improve grazing management along 2.25 miles of the river. Three hardened crossings also will be installed. The riparian area will be managed using short duration, high intensity grazing during the fall. The success of this approach will be evaluated at the end of each grazing season and adjusted as needed. **Pending.**
23. ***Big Hole River Diversion Restoration.*** See background information presented in Projects 1 and 2. This project, located on the Blake Huntley Ranch, includes upgrades to three irrigation diversion structures and installation of water measuring devices that will allow for more efficient use of irrigation diversion water. The resulting conservation of water will improve stream flows in the upper Big Hole. **Pending.**

- 24. Big Hole River Riparian Fencing.** See background information presented in Projects 1 and 2. This project, located on the Ted Christiansen Ranch, involved installation of fencing to create a riparian pasture. Electric fencing also was installed to protect stream banks and an off-stream well was developed to enhance grazing management. Approximately 1.7 miles of stream were protected. **Completed.**
- 25. Cottonwood Creek Riparian Fencing.** Cottonwood Creek (Powell County) is a tributary to the middle Blackfoot River that supports a mixed salmonid fishery – including bull and cutthroat trout. This project, located on the Dreyer Ranch, involves installation of an improved culvert, replacement of ineffective fencing, development of off-stream water, and improvements to a ford. **Pending.**
- 26. Fish Creek Channel Restoration.** Fish Creek (Jefferson County) enters the Jefferson River between Willow Springs Creek and the Boulder River. Fish Creek has potential to improve recruitment of brown and rainbow trout to the Jefferson but the channel is overly widened and shallow. This project, located on Klos Ranch, involved treating two segments of stream that together are about 3,600 ft long. Treatments included removing fine sediment, narrowing and deepening the channel, installation of riparian fencing, and construction of two bridges. **Completed.**
- 27. LaMarche Creek Stock Water Well.** Lamarche Creek (Deer Lodge County) is one of the most important spawning streams for Big Hole River fishes, including arctic grayling. Unmanaged grazing on portions of LaMarche Creek have degraded riparian areas and impacted the stream. This project involves installation of a well, pipeline, and three stock watering areas that will encourage greater utilization of upland areas by cattle and reduced use of riparian areas. **Pending.**
- 28. Murphy Spring Creek Fish Screen.** Murphy Spring Creek (Powell County) is a tributary to the North Fork of the Blackfoot River and provides spawning and rearing of bull and cutthroat trout. This project involved installation of a Coanda type fish screen that eliminated entrainment of fish into an irrigation diversion. **Completed.**
- 29. Rock Creek Habitat Enhancement.** Rock Creek (Granite County) is one of Montana's premier trout streams and supports a mixed population of salmonids, including bull trout and cutthroat trout. This project, located on the Rocking K Ranch, seeks to improve pool habitat by using a variety of means including adding large woody debris to the channel, installing J-hook and W rock weirs, and adding boulder clusters to enhance in-stream habitat. **Pending.**
- 30. Rock Creek Culvert Conversion.** Rock Creek (Powell County), one of the most important tributaries to the North Fork of the Blackfoot River, supports a mixed salmonid fishery that includes bull and westslope cutthroat trout. A stream ford



located about 4 miles upstream from the mouth was unstable and a significant source of sediment to the stream. This project replaced the ford with a pipe arch culvert. **Completed.**

31. **Rock Creek and Big Lake Creek Fish Ladders.** Rock and Big Lake creeks (Beaverhead County) are tributaries to the Big Hole River in the Wisdom area. Irrigation diversions located on these streams are presently acting as migration barriers to fluvial arctic grayling as well as other fishes. This project involves installation of Denil type fish ladders on three diversions. **Pending.**
32. **South Fork Big Swamp Creek Channel Restoration.** South Fork Big Swamp Creek (Beaverhead County) is a tributary to the Big Hole River near Wisdom. The stream flowed through a confined animal feeding operation, which severely degraded the channel and created a significant nutrient source to the stream. This project relocated the channel around the feedlot. The new channel mimicked the historic meander pattern and was lined with wetland sod mats. The new channel was fenced and livestock excluded. A small wetland was created to treat overland flow. Off stream watering was developed and a gated water gap was constructed as a back up. **Completed.**
33. **Swamp Creek Riparian Fencing.** Swamp Creek (Beaverhead County) is an important tributary to the upper Big Hole River that has been impacted by grazing. This project involves construction of riparian fencing along 6.25 miles of stream; development of two solar paneled, off-stream, stock-water wells; and construction of .35 miles of pasture fence needed to facilitate a grazing management program that will protect streamside areas. The project spans properties owned by three landowners. **Pending.**
34. **Threemile Creek Channel Enhancement.** Threemile Creek (Ravalli County) supports an abundant brook trout population as well as westslope cutthroat trout. Portions of the channel located on the Frank Mogan property are degraded due to previous grazing and upstream activities that generated excessive sediment. This project involves stabilizing eroding banks using fabric- encapsulated soil lifts and re-vegetation. Additionally, the channel will be narrowed and deepened. Approximately 3,400 feet of bank will be treated. Streamside grazing will be eliminated for five years and managed to protect riparian areas thereafter. **Pending.**
35. **Tiber Reservoir Habitat Enhancement.** Tiber Reservoir (Liberty County) supports a popular cool water fishery that includes walleye and yellow perch. Yellow perch rearing and survival is limited by a lack of hiding cover. This project involved placement of weighted Christmas tree reefs in known spawning areas located in the Willow Creek Arm. **Completed.**
36. **Whites Gulch fish Barrier.** White's Gulch (Broadwater County) supports a genetically pure population of westslope cutthroat trout in its headwaters. **The**

stream historically was placer mined. A wooden barrier that was constructed in 1996 currently maintains the genetic integrity of the population. This project seeks to replace the wooden barrier with a more permanent structure with design features that will improve the long-term effectiveness of the structure.

**Pending.**

#### Project Descriptions – 2008

*(italicized projects receive funding from HB647 because they restore habitat for bull trout and/or cutthroat trout)*

1. ***Blackfoot River Fencing.*** The Blackfoot River (Missoula County) supports populations of native bull and westslope cutthroat trout. Riparian areas on the Sansalone and Vannoy ranches suffer from unlimited grazing access to streamside areas. This project involves fencing to improve grazing management and stock tank development to provide off-stream watering. **Pending.**
2. ***Brackett Creek Channel Stabilization.*** Brackett Creek (Park County), and tributaries Nixon and Miles creeks, support a pure strain Yellowstone cutthroat trout population. Portions of these streams, as they flow through the Double D Ranch, suffer from damage caused by unrestricted riparian grazing. This project involves improving grazing management and restoring damaged streambanks and riparian areas. Treatments include back-sloping eroding banks, installation of erosion control fabric, planting of shrubs and seeding, installation of riparian fencing and development of off-stream watering. **Pending.**
3. ***Cedar Creek In-stream Water Purchase.*** Cedar Creek (Park County) is one of the most important Yellowstone cutthroat trout spawning tributaries in Paradise Valley. FWP has leased water for in-stream flow purposes in Cedar Creek for a number of years to enhance spawning and rearing habitat for cutthroat. During the last legislative session, FWP was given authority to permanently acquire water rights for in-stream flow purposes on up to 12 streams. This project involved the permanent acquisition of Cedar Creek water at flows of up to 7 cfs and at least 1.7 cfs. This water right is the second most senior on the stream. **Completed.**
4. ***Cottonwood Creek Fish Passage Improvement.*** Cottonwood Creek (Park County) supports a mixed salmonid fishery that includes Yellowstone cutthroat trout. An existing irrigation diversion located on the Arthun Ranch is presently a barrier to fish migration. Moreover, the ditch leaks even when closed, contributing to stream dewatering during low flow periods. This project involves replacing the existing diversion and installing a denil fish ladder on the new structure to provide fish passage. **Pending.**
5. ***Dunham Creek Riparian Enhancement.*** Dunham Creek (Powell County) supports important spawning habitat for fluvial bull and westslope cutthroat trout. Dunham Creek was the site of a previous restoration project but noxious weeds have colonized floodplain areas. This project involves diversifying the floodplain

to create conditions that are more favorable for support of a native plant assemblage. Treatments include excavating floodplain swales, adding woody debris, controlling weeds, and installation of vegetated soil lifts and coir logs. Containerized plantings of native shrubs will be completed to facilitate recovery. Approximately 1 mile of stream will be treated. **Pending.**

6. ***East Fork Bull River Channel Stabilization.*** East Fork Bull River (Sanders County) supports native bull and westslope cutthroat trout. A high flow event that occurred in November of 2006 caused extensive stream bank failure and triggered a slide that routed the channel into a steep eroding slope. This project involves routing the stream away from the slope and creating habitat features that are favorable for fish. Approximately 800 ft of stream will be treated. **Ongoing.**
7. ***East Fork Rock Creek Riparian Fencing.*** East Fork Rock Creek (Granite County) supports a mixed salmonid assemblage that includes westslope cutthroat trout. Riparian vegetation on the Jeffrey and Laurie Cadieux property has been altered by past grazing practices. This project involves installation of riparian fencing along approximately 3 miles of stream. A 75 ft wide buffer strip will be maintained and streamside areas will be excluded from grazing. Containerized willows and cottonwoods will be planted in riparian areas. **Pending.**
8. ***Elk Creek Riparian Fencing.*** Elk Creek (Missoula County) supports a mixed salmonid population that includes fluvial westslope cutthroat trout. Riparian areas in the lower reaches of the stream suffer from overgrazing. This project involves installation of electric fencing to restrict riparian grazing and installation of off-stream watering tanks. Approximately one mile of stream will be treated. **Pending.**
9. ***Enders Spring Creek Channel Restoration.*** Enders Spring Creek (Powell County) is a tributary to the North Fork of the Blackfoot River. Limited numbers of bull trout have been sampled in the stream but it is severely degraded from past grazing practices. This project involves restoring approximately 2 miles of stream. Treatments include narrowing and deepening the channel, increasing sinuosity, adding woody debris to the channel, and placement of sod mats to stabilize stream banks. **Pending.**
10. ***Gold Creek Irrigation Efficiency.*** Gold Creek (Powell County) sustains a spawning run of brown trout from the Clark Fork River and supports a resident trout fishery as well. The lower mile of stream is overgrazed and suffers from a feedlot located directly on the stream. Dewatering also is a concern. This project involves moving the feedlot off the channel, fencing one mile of stream to create a riparian pasture, and replacing a flood irrigation system with three center pivots. The project will result in an additional 6.5 cfs in the lower mile of stream. **Ongoing.**



11. **Feeder Creek Culvert Replacement.** Kilbrennan Lake (Lincoln County) supports a newly introduced population of Columbia redband trout. Feeder Creek is a stream that enters the lake and provides spawning habitat. However, a perched culvert located at a road crossing about 600 ft upstream from the lake is presently a barrier to fish migration. This project involves replacing the existing culvert with a larger culvert that will provide fish passage and open up an additional 0.5 miles of stream to spawning. **Cancelled.**
12. **Locke Creek Fish Passage.** Locke Creek (Park County) previously supported a spawning run from the Yellowstone River of Yellowstone cutthroat trout. However, a hard point near the mouth of the Locke Creek channel caused by a railroad crossing and the subsequent down-cutting of the Yellowstone River have resulted in perching of the Locke Creek channel, creating a fish passage barrier. This project involves construction of a series of step pools to re-establish fish passage into Locke Creek. A manually operated gate will also be installed downstream of the culvert to facilitate selective passage. **Pending.**
13. **Meadow Creek Culvert to Bridge Conversion.** Meadow Creek (Ravalli County), located on the Bitterroot National Forest, supports spawning and rearing habitat for both bull and westslope cutthroat trout. However, an existing culvert on a USFS road is presently a partial barrier to fish migration. This project would replace the existing culvert with a full span bridge. **Pending.**
14. **Moose and Swamp creeks Off-stream Livestock Water.** Moose and Swamp creeks (Beaverhead County), located in the upper Big Hole River drainage, are important spawning streams for fluvial arctic grayling. Improved riparian grazing management is an important component of the CCAA for the Big Hole. This project involves installation of off-stream watering facilities that will improve grazing management. **Pending.**
15. **Morrell Creek Fish Passage and Screens.** Morrell Creek (Missoula County) is one of the most important bull trout spawning streams in the Clearwater River drainage. Two major irrigation diversion located near the mouth are partial barriers to fish migration and potentially entrain bull trout. This project involves replacing two old wooden irrigation diversions with rock weirs, and installation of new head gates equipped with fish screens and water measuring devices that will allow for more careful flow management. **Ongoing.**
16. **North Fork Highwood Creek and Smith Creek Fish Barriers.** North Fork Highwood and Smith creeks (Chouteau County) presently support brook trout and hybridized westslope cutthroat trout. This project involves installation of barriers on both streams, removal of all salmonids, and re-introduction of pure strain westslope cutthroat trout. Approximately 4 miles of stream will be isolated above the barriers. **Pending.**

- 17. Prickly Pear Creek In-stream Flow Enhancement.** Prickly Pear Creek (Lewis and Clark County) supports a mixed salmonid fishery but chronic dewatering during July and August limits fish populations throughout much of the Helena Valley. This project involved shutting down an irrigation system that uses approximately 30 cfs of Prickly Pear Creek water and replacing the diverted water with Canyon Ferry Reservoir water purchased from the Bureau of Reclamation. The term of the project was one year. Three miles of dry stream were re-watered and flows enhanced in additional downstream reaches. **Completed.**
- 18. Thompson River Riparian Enhancement.** The Thompson River (Sanders County) supports a mixed salmonid fishery that includes native bull and westslope cutthroat trout. Invasion of exotic reed canary grass has negatively impacted riparian areas by suppressing native vegetation. A previous project to re-establish native riparian plant communities along portions of the Thompson River were successful. This proposal involved installing browse protectors around native shrubs that have become established to enhance their chance of survival. **Completed.**
- 19. York Gulch Riparian Fencing.** York Gulch (Deer Lodge County) supports the only genetically pure population of westslope cutthroat trout in the upper Big Hole River drainage. Unrestricted grazing in riparian areas has degraded the stream. This project involves installation of electric fencing and construction of three hardened cattle crossings to facilitate grazing management. Irrigation diversions in the same drainage are being reconstructed and fitted with stream gauges that will allow for more careful management of water withdrawal. **Pending.**
- 20. Beaver Creek Fish Passage Enhancement.** Beaver Creek (Hill County) supports a mixed warmwater fish assemblage that includes sauger. Fish from the Milk River move into Beaver Creek to spawn. However, an undersized culvert impedes fish passage at the project site, which is located about three miles upstream from the confluence with the Milk River. This project involves replacing the culvert with a full-span bridge. **Pending.**
- 21. Cramer Creek Channel Restoration.** Cramer Creek (Missoula County) supports a mixed salmonid assemblage. The West Fork of Cramer Creek was diverted out of its historic channel about 40 years ago. This project involves reactivating the original channel, which will restore nearly 1500 linear feet of length. The project includes channel reconstruction and revegetation. **Pending.**
- 22. Fish Creek Channel Restoration.** Fish Creek (Jefferson County) is an important spawning stream for brown and rainbow trout from the Jefferson River. This is the third in a series of projects to restore various reaches of Fish Creek. This project involves sediment removal, narrowing and deepening the channel, installation of a bridge, re-construction of water gaps for cattle, improvements to

an irrigation diversion, and riparian fencing. Approximately 4,300 ft of stream will be treated. **Pending.**

- 23. *Deer Creek Fish Passage Enhancement.*** Deer Creek (Missoula County) supports one of the largest runs of fluvial westslope cutthroat trout in the middle Clark Fork. However, an undersized culvert located in its lower reaches is presently a partial barrier to fish migration. This project involves replacing the existing culvert with a larger arch culvert. **Pending.**
- 24. *North Fork Smith River Riparian Fencing.*** North Fork Smith River (Meagher County) supports a mixed salmonid fishery. The stream, as it flows through the Gene Olsen Ranch, is heavily impacted by grazing. This project involves constructing riparian fencing along 2.11 miles of stream (both sides), developing off-site water, and treating selected reaches of stream bank that are heavily eroded. **Pending.**
- 25. *Snowbank Creek Diversion Modification.*** Snowbank Creek (Lewis and Clark County) supports bull and westslope cutthroat trout. An unmanaged diversion structure presently routes water from Snowbank Creek into Snowbank Lake. The system as it exists, dewateres Snowbank Creek below the diversion and entrains migrating cutthroat and bull trout in Snowbank Lake. This project involves modifying the diversion to re-establish fish passage, screening the diversion to eliminate entrainment, and a water management plan that will restore flows in Snowbank Creek. **Pending.**
- 26. *Wheelbarrow Creek Livestock Water Gaps.*** Wheelbarrow Creek (Ravalli County) supports a mixed salmonid fishery. Portions of Wheelbarrow Creek as it flows through the Wheelbarrow Creek Ranch are degraded as a result of cattle use. This project involves construction of three gravel-hardened water gaps, reshaping 90 ft of channel, installation of coir logs along 80 ft of bank, and re-vegetation of selected stream banks. **Pending.**
- 27. *White's Gulch Fish Barrier Supplemental.*** White's Gulch (Broadwater County), located on the Helena National Forest, supports an important population of genetically pure westslope cutthroat trout. **This stream was historically placer mined.** A barrier was installed eleven years ago to prevent competition from brook trout, which are abundant downstream of the barrier. However, the current barrier is in need of replacement. This project involves replacing the existing barrier. This project had previously been funded but the cost of the barrier has increased. **Pending.**





**Photo Illustration 1.** The upper two photos display a fish passage improvement project on Cottonwood Creek, a tributary to the Blackfoot River. This project replaced an existing perched culvert (upper left photo) with a bridge (upper right photo) to open upstream fish passage for both westslope cutthroat trout and bull trout. The lower two photos display a fish passage improvement project on Meadow Creek, a tributary to the East Fork Bitterroot River. This project also replaced an existing culvert (lower left photo) with a bridge (lower right photo) to enhance fish passage for both westslope cutthroat trout and bull trout.





**Photo Illustration 2.** Fish passage barrier construction on Crooked Creek, a tributary to the Big Horn River, located south of Billings. Crooked Creek supports one of the eastern most populations of Yellowstone cutthroat trout. A natural passage barrier that protected the genetic integrity of the population washed out during a 100-year rainstorm. This project involved reconstruction of a passage barrier near a natural bedrock constriction to protect this unique population from invasion by non-native fishes. The upper photo shows the barrier under construction and the lower photo shows the barrier upon completion.



**Photo Illustration 3.** Installation of large woody debris into Beavertail Pond, located near the community of Clinton in the Clark Fork drainage. The strategic placement of large conifers along the shoreline (upper photo) and salvaged Christmas trees (lower photo) provides cover and habitat complexity for yellow perch, pumpkinseed and largemouth bass.





**Photo Illustration 4.** Fish screens installed on two irrigation diversions to prevent fish from being lost down irrigation systems and, at the same time, allowed water users to obtain their water in an unimpeded manner. The upper photo shows a coanda style fish screen and fish passage ladder installed on Murphy Spring Creek, a tributary to the North Fork Blackfoot River. The stream is important to both westslope cutthroat trout and bull trout. The lower photo shows a drum style screen installed in a diversion located on Big Creek, a tributary to the upper Yellowstone River. Big Creek supports significant spawning runs of Yellowstone cutthroat trout.



**Photo Illustration 5.** Upstream fish passage at the T&Y diversion on the Tongue River, a tributary to the Yellowstone River near Miles City. The T&Y diversion dam, located about 20 miles upstream from the confluence with the Yellowstone River, acted as a fish passage barrier and blocked spawning runs of fish from the Yellowstone and lower Tongue. A fish passageway was constructed around the diversion, enhancing upstream passage for a rich assemblage of native warm water fishes. The upper photo shows construction activity on the passageway with the dam showing on the extreme right. The lower photo shows the completed passage channel.





**Photo Illustration 6.** Channel restoration on Eustache Creek, a tributary to Ninemile Creek in the Clark Fork watershed. Historical placer mining in the Eustache drainage created a braided and intermittent stream channel (upper photo). Installation of a series of ground water retention sills (middle photo) resulted in the establishment of a permanently flowing stream channel (lower photo), benefiting both westslope cutthroat trout and bull trout. Photos provided by the USFS.





**Photo Illustration 7.** Channel restoration on Box Elder Creek, a tributary to Telegraph Creek and ultimately Fort Peck Lake. The project restored watershed connectivity by re-constructing a natural meandering channel that historically had been leveled for farming practices. The project also is working towards re-establishing native prairie grasses and streamside woody vegetation. The upper photo shows the area where the stream channel had been obliterated by past farming practices. The lower photo shows the newly restored channel. This project benefits a diverse assemblage of native prairie fish species.



**Photo Illustration 8.** Riparian habitat enhancement and bank stabilization on a 3,000-foot reach of the Missouri River, located near the community of Craig in Lewis and Clark County. The upper photo shows the actively eroding riverbank (far bank) prior to restoration. The lower photo shows the restored riverbank. The work involved bank sloping and re-vegetation, riparian fencing and off river livestock water development. The project benefits both rainbow trout and brown trout residing in the river.





**Photo Illustration 9.** Installation of a large siphon located underneath Skalkaho Creek at the Hedge Canal crossing near Hamilton. Skalkaho Creek is a significant tributary to the Bitterroot River. The installed siphon separates canal water from creek water and prevents the loss of fish into the large irrigation system. The upper photo shows the Hedge Canal (foreground) entering into and intermingling with Skalkaho Creek prior to the installation of the siphon. The middle photo shows the construction of the siphon inlet works. The lower photo shows the completed siphon (without the controlling headgate installed). This project benefits both westslope cutthroat trout and bull trout.



# Appendix A

## Future Fisheries Improvement Program Fisheries Monitoring Report 2008

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# Introduction

This report summarizes the results of monitoring conducted from 2007-2008 to evaluate the effectiveness of selected habitat restoration projects funded through the Future Fisheries Improvement Program (FFIP).

The success of fish habitat restoration projects is dependant on a wide range of variables, many of which are beyond the control of the project applicant and attending biologist. Much of the State remained in drought conditions in 2007 for the seventh straight year with record-high temperatures, while 2008 saw a return to more average rainfall and temperatures. Such fluctuations exert a tremendous influence on fish populations.

Still, monitoring is an essential tool to help biologists, engineers, and landowners understand what types of projects provide the most benefits to fish populations, even in the midst of widely-ranging climatic conditions. Biologists are seeing that in many instances, fish abundance indices remained stable or increased despite extremely low base flows in sampled reaches of FFIP projects. These data suggest that for many streams, low flows caused by drought can be partially mitigated through the types of habitat improvement projects detailed in this report.

This report presents data collected for 37 projects on 32 different streams and one reservoir. These data, as well as conclusions, are considered preliminary because it often takes five years or more for fish populations to fully respond to habitat improvement treatments.

# Big Hole River Drainage

## Big Hole River Ralston Riparian Fence Project

**WATER NAME:** Bryant Creek and Big Hole River (Big Hole River)

**DATA PROVIDED BY:** Jim Magee, FWP

**FFI NUMBER:** 002-07

**STATUS:** Completed in November 2007.

**Restoration Objectives:** To enhance riparian vegetative community that will stabilize banks, reduce sedimentation, provide cover, decrease temperatures and develop habitats that benefit Arctic grayling and numerous other native and sportfish species. This project will enhance riparian vegetation and stream banks by fencing the stream corridor and creating multiple pastures, and by providing an alternate water source for livestock. This project will include a grazing management plan developed through the CCAA Program.

**Project Description:** Riparian fence was constructed on Approximately 2.7 miles of stream bank on the Big Hole River and 0.5 miles on Bryant Creek. A wildlife exclusion fence has been built to protect haystacks. Two measuring devices were also installed in irrigation diversions to allow the landowner to better manage diverted water.

**Monitoring:** The new riparian fence allows the landowner flexibility in grazing management that includes pasture rotations. The change in livestock management is benefiting riparian and stream channel function. Stock water system is currently being developed through the contributing funding sources.

## Big Hole River Riparian Fencing Harrington Reach Project

**WATER NAME:** Big Hole River

**DATA PROVIDED BY:** Jim Magee, FWP

**FFI NUMBER:** 026-07

**STATUS:** Completed in Fall 2008

**Restoration Objectives:** To enhance riparian vegetative community that will stabilize banks, reduce sedimentation, provide cover, decrease temperatures and develop habitats that benefit Arctic grayling and numerous other native and sportfish species. This project will create multiple pastures and will coincide with a grazing management plan developed through the CCAA Program.

**Brief Project Description:** Riparian fence was constructed on approximately 3.0 miles of streambank on the mainstem Big Hole River just north of Wisdom. Grazing management that benefits stream channel and riparian vegetation will begin in fall 2008.

**Monitoring:** Monitoring will begin in 2009.



## **Big Hole River Riparian Fencing Christiansen Reach Project**

**WATER NAME:** Big Hole River

**DATA PROVIDED BY:** Jim Magee, FWP

**FFI NUMBER:** 028-007

**STATUS:** Completed in fall 2007.

**Restoration Objectives:** To enhance riparian vegetative community that will stabilize banks, reduce sedimentation, provide cover, decrease temperatures and develop habitats that benefit Arctic grayling and numerous other native and sportfish species. This project will create multiple pastures and will coincide with a grazing management plan developed through the CCAA Program.

**Project Description:** Permanent riparian fence was constructed on 1.25 miles of riverbank on the Big Hole River. Temporary electric fence was constructed on 1.7 miles of riverbank to create a riparian pasture and protect banks from livestock impacts. Riparian fences will break the property into multiple pastures.

**Monitoring:** Riparian fence provides landowner flexibility in grazing management that include pasture rotations and livestock management that benefited riparian and stream channel function in summer and fall 2008.

## **LaMarche Creek Stock Water Project**

**WATER NAME:** LaMarche Creek (Big Hole River)

**DATA PROVIDED BY:** Jim Magee, FWP

**FFI NUMBER:** 031-007

**STATUS:** Project completed in fall 2008.

**Restoration Objectives:** The purpose of this project was to provide alternative water for livestock away from the stream and riparian area. The protected riparian vegetative community will stabilize banks, reduce sedimentation, provide cover, decrease temperatures and develop habitats that benefit Arctic grayling and numerous other native and sport fish species. This project will allow utilization of upland pastures and minimize impacts from livestock grazing in riparian areas. This project is part of a larger conservation plan developed through the Big Hole Arctic Grayling Candidate Conservation Agreement with Assurances Program (CCAA) for LaMarche Creek, which includes riparian fencing, pool enhancement, a grazing plan and an instream flow conservation plan.

**Brief Project Description:** A stock watering system was developed which involves drilling two wells and constructing a pipe line to provide water to stock water tanks. A total of 6,100 feet of pipeline will bring water from two new wells, to 3 stock tanks on upland pastures.

**Monitoring:** Project completed in fall 2008. Stock systems will be used in summer 2009.

### **Swamp Creek Riparian Fencing Project**

**WATER NAME:** Swamp Creek (Big Hole River)

**DATA PROVIDED BY:** Jim Magee, FWP

**FFI NUMBER:** 037-007

**STATUS:** Completed November 2008.

**Restoration Objectives:** Riparian fence will be constructed to enhance riparian vegetative community that will stabilize banks, reduce sedimentation, provide cover, decrease temperatures and develop habitats that benefit Arctic grayling and numerous other native and sportfish species. This project will create multiple pastures, and will coincide with a grazing management plan developed through the CCAA Program.

**Project Description:** Riparian fence will be constructed on 12.5 miles of streambank on Swamp Creek, a tributary to the Big Hole River. An additional 0.35 miles of pasture fence will be built and will allow landowner to utilize pastures outside riparian corridor. This is a multi-phase project. Construction of the riparian fence will be followed by developing two stock water wells and additional stream restoration efforts such as bank stabilization, native vegetation enhancement and planting etc. in 2009.

**Monitoring:** Grazing management will be implemented in 2009 that will benefit riparian vegetation. Additional riparian and habitat restoration will begin in fall 2009.

### **Big Hole River Huntley Diversion Restoration Project**

**WATER NAME:** Big Hole River

**DATA PROVIDED BY:** Peter Lamothe, FWP

**FFI NUMBER:** 028-07

**STATUS:** Project construction scheduled for fall 2008.

**Restoration Objectives:** To allow more efficient use of irrigation diversion water. The resulting conservation of water will improve stream flows in the upper Big Hole.

**Project summary:** The NRCS, FWP and DNRC collaborated with Ralph Huntley and Son, Inc. to improve the ability to control and measure irrigation withdrawals from the Big Hole River at three points of diversion. The project will replace three existing diversions and four headgates in need of repair. The project will also install two irrigation water-measuring devices (i.e., flumes) in the associated irrigation systems.

**Monitoring:** Monitoring for this project will occur through the implementation of the site-specific plan (i.e., conservation plan) as part of the Big Hole Grayling CCAA Program. As part of this program the landowner will have to maintain diversions of irrigation water within the constraints of existing water rights for the property. The program also requires reductions in diversions of irrigation water as streamflow levels drop in this part of the watershed. Montana Fish, Wildlife and Parks is required to monitor compliance with the site-specific plan on an annual basis.

# Bitterroot River Drainage

## Meadow Creek Culvert to Bridge Conversion Project

**WATER NAME:** Meadow Creek (Bitterroot River)

**DATA PROVIDED BY:** Michael J. Jakober, USFS

**FFI NUMBER:** 013-2008

**STATUS:** Completed in May 2008

**Restoration Objectives:** Meadow Creek, located on the Bitterroot National Forest in Ravalli County, supports spawning and rearing habitat for both bull and westslope cutthroat trout. However, an existing culvert on a USFS road presented a partial barrier to fish migration because of a two foot hydraulic jump at the inlet of the culvert. This project would replace the existing culvert with a full span bridge.

**Project Summary:** In May 2008 the Bitterroot National Forest removed the barrier culvert at the Road 5758 crossing of Meadow Creek, and a constructed a new bridge in its place. The bridge was sized to span the entire bankfull channel, and pass the 100-year flood with associated bedload and debris.

**Monitoring:** All sizes and life stages of bull trout and westslope cutthroat trout are now able to move freely past the Road 5758 crossing. This is expected to enhance spawning and rearing for both species in the future.



# Blackfoot River Drainage

## Ashby Creek Stream Channel Restoration Project

**WATER NAME:** Ashby Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 002-005

**STATUS:** Completed in 2007

**Restoration objectives:** To protect the genetic purity of a WSCT population in the upper Ashby Creek watershed by using an existing wetland complex as a migration barrier, and improve WSCT habitat by creating a natural channel that provides complexity; increasing riffle-pool habitat features and available spawning substrate, shade, and small diameter wood recruitment to the stream channel. Another objective of the project is to improve and re-establish the functionality of the associated wetlands.

**Project Summary:** Ashby Creek is a 2<sup>nd</sup> order tributary to Camas Creek in the Union Creek basin that supports a genetically pure WSCT population. The upper reaches of Ashby Creek originate in forested areas on Plum Creek and BLM properties before entering private ranch lands near mile 3.0. Historical and recent agricultural practices have significantly altered Ashby Creek. Alterations include a diversion for irrigation, channel ditching, degraded stream banks from unrestricted livestock use, loss of woody plant communities, irrigation-related dewatering, and the draining of downstream wetlands.

Over the past several years a comprehensive restoration project plan was developed and finally implemented in 2007. The project included 1) reconstruction of three miles of stream that had been historically ditched, 2) enhanced instream flows, 3) improved upstream fish passage and the installation of a fish screen at a diversion point, 4) riparian grazing changes, and 5) shrub plantings. This project also connected Ashby Creek to an 80-acre scrub-shrub wetland in a manner that is designed to inhibit the upstream movement of fish.

**Monitoring:** In 2005, we established pre-project fish population survey sites at an upstream reference at mile 4.0. In 2007 we also established two fish population survey sites in the new channel at mile 3.0 and a downstream survey site at mile 2.0. At this early stage of post-project monitoring, we have identified no fish within either of the two new (treatment area) population-monitoring sites.

## **Bear Creek Channel Restoration Project**

**WATER NAME:** Bear Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 028-98

**STATUS:** Completed in 1999.

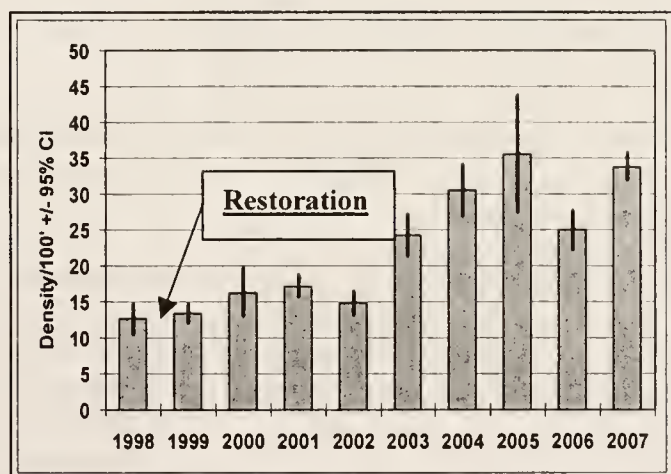
**Restoration Objectives:** Restore habitat degraded by historical activities in the channel, restore fish passage and thermal refugia, and improve recruitment of trout to the Blackfoot River.

**Project Summary:** Bear Creek, a small 2<sup>nd</sup>-order tributary to the lower Blackfoot River, flows six miles north to its mouth where it enters the Blackfoot River at rm 12.2 with a base-flow of 3-5 cfs. Bear Creek is one of the colder tributaries to the lower Blackfoot River.

Located on industrial forest and agricultural lands, Bear Creek has a long history of adverse habitat changes, which include use of undersized culverts, improper road drainage and resulting siltation, irrigation, channelization of the stream, excessive riparian grazing and streamside timber harvest. At least one road crossing is still considered a barrier to movement. Prior to restoration activities, these fisheries impairments contributed to the loss of migration corridors and the simplification and degradation of salmonid habitat. Many of these impairments were corrected in the late 1990s, and these included: 1) upgrading culverts and addressing road drainage problems; 2) improving water control structures at irrigation diversions; 3) reconstructing 2,000' of channel; 4) enhancing habitat complexity on an additional 2,000' of stream; 5) shrub plantings; and 6) the development of compatible riparian grazing systems for one mile of stream.

**Monitoring:** Bear Creek supports predominately rainbow trout and lower numbers of brown trout and brook trout in the lower stream, along with WSCT in the upper basin and very low densities of juvenile bull trout. Following restoration actions in 1999, fisheries monitoring has identified Bear Creek as an increasingly important spawning and rearing tributary to the lower Blackfoot River sport fishery.

In 2006 and 2007, we continued to monitor fisheries in a reconstructed section (mile 1.1) of Bear Creek. This monitoring has identified a general trend of increasing densities of juvenile rainbow trout (Fig. 1). We also tested for whirling disease at mile 1.1 in 2006 and found no infection.



**Figure 1.** Densities of age 1 and older rainbow trout for Bear Creek at mile 1.1, 1998-2007.

## Chamberlain Creek Restoration Project

**WATER NAME:** Chamberlain Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 009-97

**STATUS:** Completed in early 1990's and 1998.

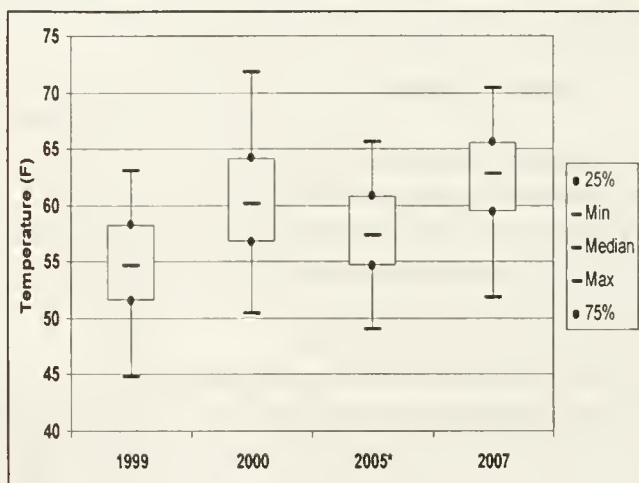
**Restoration objectives:** Improve access to spawning areas; improve rearing conditions for WSCT; improve recruitment of WSCT to the Blackfoot River; provide thermal refuge and rearing opportunities for fluvial bull trout.

**Project Summary:** Chamberlain Creek is a small Garnet Mountain tributary to the middle Blackfoot River, entering near rm 43.9 with a base-flow of 2-3 cfs. Prior to 1990, sections of lower Chamberlain Creek were dewatered and severely altered (grazing and channelization), leading to sharp declines in WSCT densities. During the early 1990s, Chamberlain Creek was also one of the first comprehensive restoration projects within the Blackfoot Basin. Restoration emphasized road drainage repairs, riparian livestock management changes, fish habitat restoration, irrigation upgrades (consolidation of ditches, water conservation, elimination of fish entrainment and fish ladder installation on a diversion), conservation easements, and improved stream flows through water leasing. Restoration occurred throughout the drainage with an emphasis in the lower section.

**Monitoring:** Chamberlain Creek is a WSCT-dominated stream over its entire length although lower reaches also support rainbow and brown trout in low abundance.

Following restoration and WSCT recovery in lower Chamberlain Creek, radio telemetry identified Chamberlain Creek as a primary spawning stream for fluvial WSCT from the Blackfoot River (Schmetterling 2001). In 2006-07, we continued to monitor fish population densities, water temperature and whirling disease in the restoration area near the mouth. Fish population surveys at mile 0.1 identify >10 years of stable densities of age 1 and older WSCT (Figure 3). Periodic water temperature monitoring suggests recent warming (Figure 2).

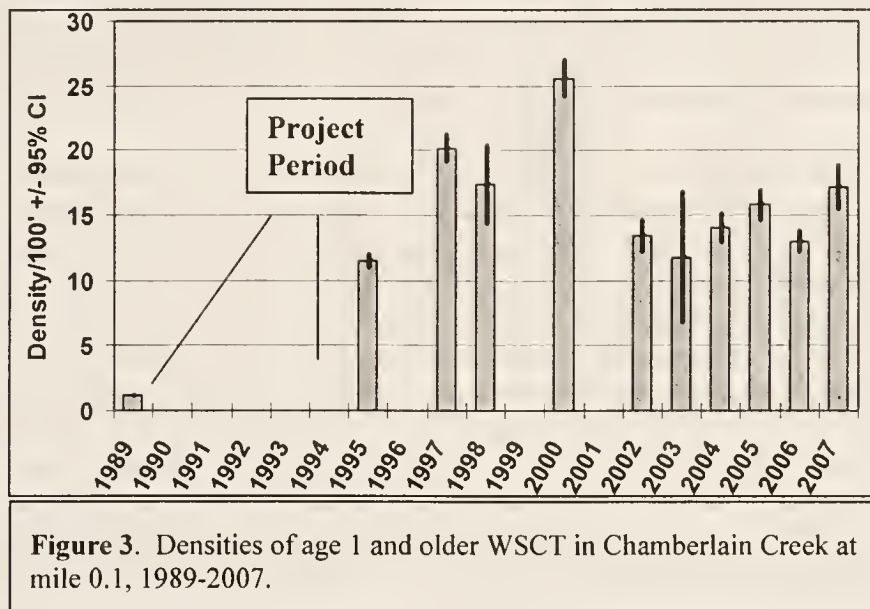
In 2007, we continued to test Chamberlain Creek for whirling disease (using sentinel exposures) at an established downstream monitoring site (mile 0.1), and at two upstream (miles 0.7 and 3.8) locations. The two lower sentinel cages were placed up-and downstream of artificial ponds to help assess whether these stream-connected ponds might contribute to a high severity of disease as previously identified (Pierce et al 2006). This test identified mean grade infection rates were slightly higher downstream of the ponds than upstream of the ponds



**Figure 2.** July water temperatures for Chamberlain Creek at stream mile 0.1, 1999, 2000, 2005 and 2007.



(mean grade infection = 1.89 below versus 1.21 above). Interpreting these results however remains difficult, as the mean grade infection at mile 0.1 was notably lower in 2007 (1.89) than when last tested in 2005 (3.78). Consistent with earlier exposures, whirling disease was not detected at mile 3.8.



### Cottonwood Creek Restoration (various projects)

**WATER NAME:** Cottonwood Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 007-96, 044-96, 037-97, 030-98, 008-99, 037-99, 038-99, 009-00, 010-00, 004-03, 002-06

**STATUS:** all completed

**Restoration objectives:** improve degraded habitat; eliminate fish losses to irrigation ditches; and restore instream flows and migration corridors for native fish.

**Project Summary:** Cottonwood Creek, a 3<sup>rd</sup> order stream, flows ~16-miles south from the Cottonwood Lakes and enters the middle Blackfoot River at rm 43 with a base-flow of ~15 cfs. Genetically pure WSCT and bull trout dominate the headwaters of Cottonwood Creek. Rainbow trout, brook trout and brown trout dominate middle to lower stream reaches. Cottonwood Creek is considered a “core area” and was designated as “proposed critical habitat” under the ESA for the recovery of bull trout.

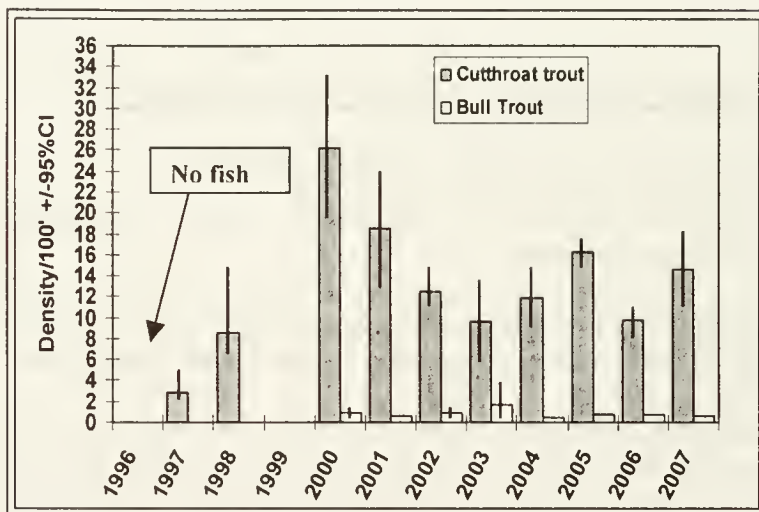
Cottonwood Creek has been the focus of irrigation-related fisheries improvements since 1996. In 2006-07, fisheries improvements were undertaken in both the middle and upper reaches of Cottonwood Creek. In upper Cottonwood Creek, the Blackfoot Cooperators replaced an undersized (and perched) culvert at mile 15.9. This project restored fish passage to ~1.0 mile of stream, while correcting channel incision and erosion problems downstream of the culvert. Grazing and irrigation-related projects are now the focus of

developing projects on public lands along middle Cottonwood Creek. These developing projects result from livestock-related degradation of riparian areas on both the University of Montana (Bandy Experimental Ranch) and FWP (Blackfoot Clearwater Game Range - Dryer Ranch) properties. Additional fisheries impacts involve the unauthorized use of an FWP diversion during the native fish migration period. This use has compromised native fish migrations to upstream spawning areas in recent years.

In an attempt to address these concerns, both U of M and FWP have assessed their properties and are identifying steps to make necessary changes. These assessments include fish population surveys and spawning site surveys (Pierce et al 2006), as well as a series of riparian health assessments conducted by the U of M Forestry School in 2007. On the FWP properties, corrective measures include 1) the exclusion of livestock from immediate stream banks and degraded spring creek complexes, 2) upgrades at three stream crossing, 3) off-stream water developments, 3) the removal of a diversion, and 4) dedication of irrigation water rights to instream flows. On the Bandy Ranch, irrigation pump sites are being modified and attempts to correct riparian grazing problems are being pursued. Corrective measures, if successful, are expected to improve riparian health along the middle of Cottonwood Creek, while enhancing native fish conditions in middle and upper reaches of Cottonwood Creek.

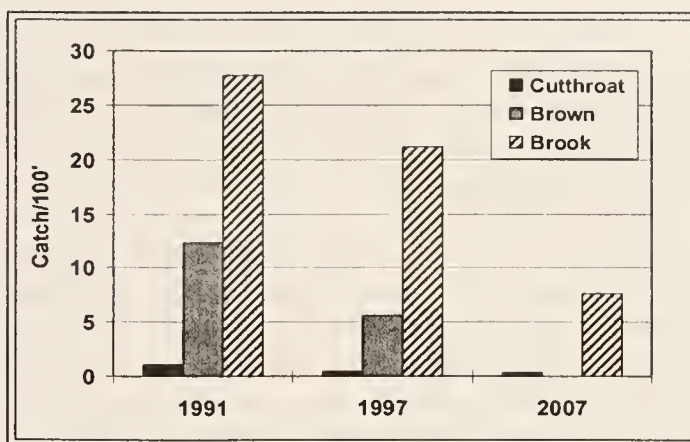
**Monitoring:** In 2006 and 2007, we continued to monitor fish populations in upper and middle Cottonwood Creek (mile 12.0 and 7.5, respectively) where enhanced flow, irrigation ditch screening and diversion upgrades were made. Prior to 1997 this section was completely dewatered during late summer and fall by irrigation

At the upper Cottonwood Creek monitoring site (mile 12.0), age 1 and older WSCT have remained stable in recent years, following an initial increase in the late 1990s. Bull trout densities have remained static at low densities (Figure 4). By contrast, fisheries at the middle Cottonwood Creek (mile 7.5) monitoring site show community-level decline in the area of livestock over-use (Figure 5).



**Figure 4.** Densities for age 1 and older native salmonids in Cottonwood Creek at mile 12.0, 1996-2007.

Water temperature monitoring in lower Cottonwood Creek shows continued warming since 2001. Sentinel exposures near the mouth (mile 1.1) from 2006 and 2007 show a continuous high severity of whirling disease (mean grades of 3.96 and 4.25, respectively).



**Figure 5.** CPUE for salmonids in Cottonwood Creek at mile 7.5 in 1991, 1997 and 2007.

### **Enders Spring Creek Channel Reconstruction Project**

**WATER NAME:** Enders Spring Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 009-08

**STATUS:** completed in fall 2008

**Restoration objectives:** Restore the spring creek to natural “C4-type” spawning channel, reduce water temperatures to level suitable for bull trout, reduce instream sediment levels, enhance habitat quality utilizing in-stream structures, vegetation and provide suitable substrate for spawning.

**Project Summary:** Enders Spring Creek is a heavily degraded 1<sup>st</sup>-order spring creek that enters the North Fork of the Blackfoot River at mile 6.3. Stream discharge was measured at 6.5 cfs on May 30, 2007.

Like other spring creek tributaries to the North Fork, Enders Spring Creek has a long-history of adverse human-related changes to salmonid habitat. These stem from past agricultural activities and include the loss of sinuosity; channel widening; and heavy sediment loading in pools and glides. Enders Spring Creek is the last major spring creek to the North Fork that requires active restoration.

Restoration will include two-miles of complete channel reconstruction similar to the Jacobsen Spring Creek project (*see* Jacobsen Spring Creek), and was completed in early fall of 2008. Like all other spring creeks restoration projects on the North Fork, ensuring compatible grazing strategies will be critical to the future success of this project.



**Monitoring:** In 2006 and 2007 in advance of channel reconstruction, we conducted a series of baseline studies that included fish population surveys at mile 0.5, and a habitat (channel) survey that also included water temperature, water chemistry, substrate and discharge measurements.

Fish population survey recorded primarily brook trout, brown trout, mountain whitefish at low densities and very low densities of bull trout. The habitat survey measured low sinuosity, high W/D ratios and bankfull widths ranging from 8-68'. Pre-project (2007) water temperature recorded maximum summer temperature of 60.1°F near the mouth. Although a Wolman pebble count at mile 0.1 identified a gravel-dominated (D75 = 68mm, D50= 31mm and D25=9mm) substrate in a representative riffle, heavy loading of fine sediment was noted in pools and glides.

### **Gold Creek Pool Development Project**

**WATER NAME:** Gold Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 004-96

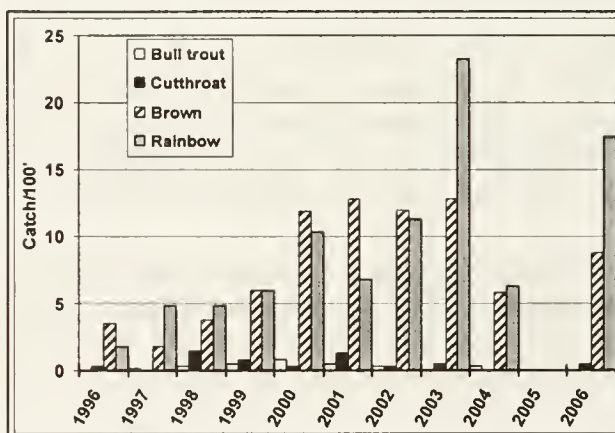
**STATUS:** completed in 1997

**Restoration objectives:** Restore pool habitat and morphological complexity; restore thermal refugia for Blackfoot River native fish species.

**Project Summary:** Gold Creek is the largest tributary to the lower Blackfoot River, entering at mile 13.5. The majority (90%) of the Gold Creek watershed is industrial forest. Past harvest of riparian conifers combined with the actual removal of large wood from the channel reduced habitat complexity on the lower three-miles of Gold Creek. The result of this fish habitat simplification was low densities of age 1 and older fish. In 1996, we installed 66 habitat structures made of native material (rock and wood) constructing 61 new pools in the 3-mile section. Prior to restoration work, we established a baseline fish population survey section (mile 1.9) in the treated area for future monitoring.

**Monitoring:** Gold Creek is a major spawning tributary to the lower Blackfoot River for bull trout, WSCT, rainbow trout, and brown trout. Resident brook trout also inhabit the drainage. Gold Creek's mainstem and confluence area provides thermal refugia for Blackfoot River bull trout during periods of river warming.

In 2006 and 2007, we continued to monitor 1) post-restoration fish



**Figure 6.** CPUE for age 1+ fish in Gold Creek at mile 1.9, 1996 – 2006.

population monitoring in the project area, 2) bull trout redds, and 3) water temperatures and whirling disease near the mouth. Fish population surveys show a 10-year upward trend in CPUE for fish >4.0" within the restoration project area (Figure 6). However, these samples identified consistently low bull trout densities, and in 2006 we failed to detect bull trout in the monitoring sites. Our bull trout redd counts identified only one redd in 2007 and none in 2006 compared to seven in 2005. Water temperature recordings at mile 1.9 show a nine-year warming trend. Whirling disease tests in 2006 and 2007 near the mouth of Gold Creek were negative.

### **Jacobsen Spring Creek Channel Reconstruction Project**

**WATER NAME:** Jacobsen Spring Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 030-05

**STATUS:** Completed in 2007.

**Restoration objectives:** Maximize secondary instream productivity; maximize quality of shoreline rearing areas; restore spawning site potential by reducing levels of fine sediment in riffles to a level suitable for spawning; reduce summer water temperatures suitable for bull trout (<60°F); provide high quality pools with high level of complex cover; maximize use of existing channel belt-width and existing shoreline areas.

**Project Summary:** Jacobsen Spring Creek forms from two spring creeks that merge at mile 0.7 and generate a base-flow of 4-7cfs near the mouth (Figure 19). This small spring creek system enters the North Fork of the Blackfoot River at mile 4.7. According to landowner accounts, Jacobsen Spring Creek historically supported both bull trout and WSCT. Jacobsen Spring Creek was severely degraded due to historic grazing and timber harvest practices, the consequences of which include an over-widened stream channel, low sinuosity, elevated water temperatures and excessive sediment loading (Pierce et al 2006). However, early habitat investigations identified the spring creek as possessing the basic habitat components necessary for improved fisheries such as stable groundwater inflows, gravel substrate and a relatively dense riparian spruce forest that has potential to provide shade, complexity, and wood to the stream channel.

Between 2005 and 2007, the entire 17,220' of Jacobsen Spring Creek (both channels) was reconstructed. The project emphasized a deep and narrow channel with higher sinuosity (Figure 7), the inclusion of backwater and shoreline rearing areas, gravel in pool tail-outs, and the placement of instream wood and sod mats on the stream banks to facilitate recovery. The project also included shrub plantings and the adoption of livestock management changes consistent with project objectives.

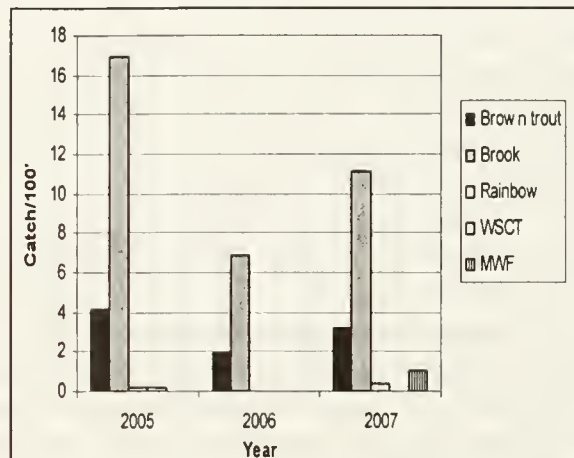
Channel measurements	Pre-restoration	Post-restoration	% change
Stream Channel Length	3150	3800	20.6
Sinuosity	1.2	1.4	16.7
Total # Pools	19	58	205
# Sampled Pools	10	29	190
Pool Frequency	6.0 / 1000ft	15.3 / 1000ft	155
# Pools Measured with LWD	9 ( 90%)	28 ( 97%)	211
Pool Length	37 ± 21 (14 - 79)	21 ± 6 (13 - 34)	43
Wetted Pool Surface Area	858 ± 626 (224 -1859)	208 ± 52 (112 - 299)	-76
Maximum Pool Depth	1.7 ± 0.7 (0.9 - 3.3)	3 ± 0.4 (2 - 3.4)	76
Wetted Pool Width @ Max Depth	20 ± 10 (9 - 44)	11 ± 2 (7 - 14)	-45
Wetted Width @ Riffle Crest	24 ± 12 (8 - 47)	9 ± 2 (7 - 14)	-62
Bankfull Width @ Max Pool Depth	21 ± 10 (9 - 44)	12 ± 2 (9 - 19)	-43
Bankfull Width @ Riffle Crest	24 ± 12 (8 - 47)	11 ± 2 (8 - 16)	-54
Riffle Crest Depth	0.6 ± 0.2 (0.4 - 0.9)	1 ± 0.2 (0.5 - 1.5)	67
Residual Pool Depth	1.1 ± 0.7 (0.3 - 3)	1.7 ± 0.3 (0.8 - 2.2)	55

All measurements in standard (ft) units

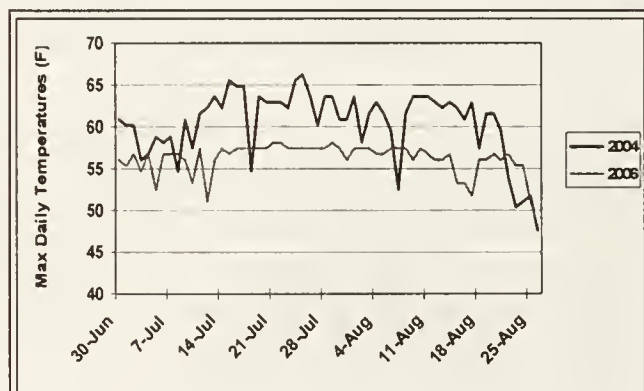
**Figure 7.** Pre-and post restoration channel measurements for the lower 0.7 miles of Jacobsen Spring Creek.

**Monitoring:** In 2006-07, we returned to our pre-project baseline monitoring locations and completed 1) a post-project habitat survey downstream of mile 0.7, 2) a fish population survey site (mile 0.6) established in 2005, and 3) water temperature monitoring site near the mouth.

At this early stage of post-project fisheries monitoring, fisheries have expressed no appreciable change (Figure 8); however, rainbow trout spawning (redds) were identified in Jacobsen Spring Creek in the spring of 2007 and rainbow alevins were present in constructed backwater areas during the 2007 surveys. Mountain whitefish, absent from previous surveys, were also identified in the new channel in 2007. With summer temperatures now cooler than lower North Fork, Jacobsen spring creek should attract an increased level of bull trout use in the future (Figure 9).



**Figure 8.** CPUE for salmonids in Jacobsen Spring Creek at stream mile 0.6, 2005-2007.



**Figure 9.** Pre (2004) and post-project (2006) max\min daily waters temperatures for Jacobsen Spring Creek near mouth, summer 2004 and 2006.



## Kleinschmidt Creek Channel and Riparian Restoration Project

**WATER NAME:** Kleinschmidt Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 044-99, 031-05

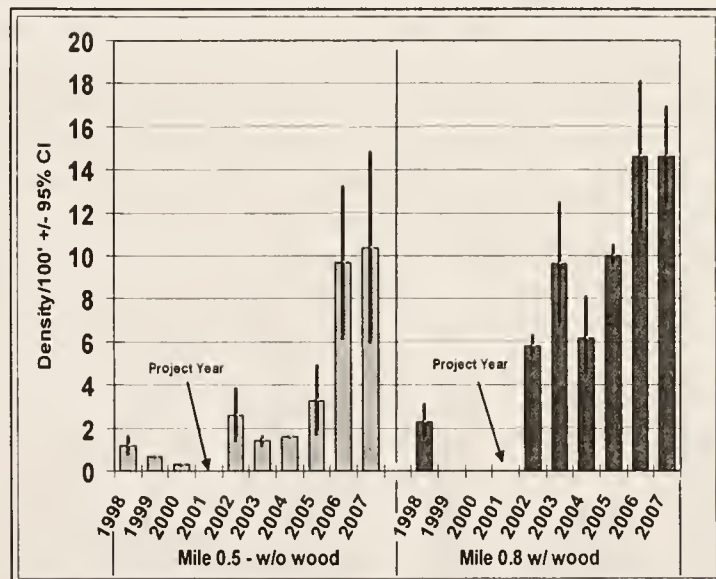
**STATUS:** Restoration projects completed in 1991, 2001, and 2006.

**Restoration objectives:** Reduce whirling disease infection levels; restore stream channel morphology for all life stages of trout; increase recruitment of trout to the Blackfoot River; and restore thermal refugia and rearing areas for North Fork Blackfoot River bull trout.

**Project Summary:** Kleinschmidt, a spring creek tributary with a base flow of ~9 cfs, joins with Rock Creek at mile 0.1 before entering the North Fork of the Blackfoot River at mile 6.2. Kleinschmidt Creek has a long history of stream degradation involving livestock over-use and channel alterations related to instream rock dams, undersized culverts and highway channelization. Restoration of Kleinschmidt Creek began in 1991, and expanded substantially in 2001 with 6,250' of stream reconstructed to a longer, narrower, deeper and more sinuous channel. The work has reduced maximum water temperatures from a high of ~70° F to <60° F (Pierce et al 2006). In 2006 restoration continued with ~600' of channel reconstruction and riparian grazing changes in the upper-most perennial section of stream.

**Monitoring:** During the 2006 and 2007, we resurveyed at two locations (mile 0.5 and 0.8) of lower Kleinschmidt Creek established in 1998 prior to channel reconstruction. These sites were established to assess restoration techniques involving the placement of large instream wood into E4-type channels. We placed no instream wood in the reconstructed channel at mile 0.5, whereas the rest of the channel, including the mile 0.8 survey site, included instream wood placements.

Both sites show higher densities of age 1 and older brown trout compared to the pre-project periods; however the section with wood has continuously recorded higher brown trout densities (Figure 10). WSCT and bull trout were not detected in the two monitoring sections between 1998 and 2003; however both native species were consistently identified in very low densities in the section with wood (mile 0.8) in recent years.



**Figure 10.** Estimated densities of age 1 and older brown trout in two sections of Kleinschmidt Creek, 1998-2007.

## Lincoln Spring Creek Channel Reconstruction Project

**WATER NAME:** Lincoln Spring Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 012-07

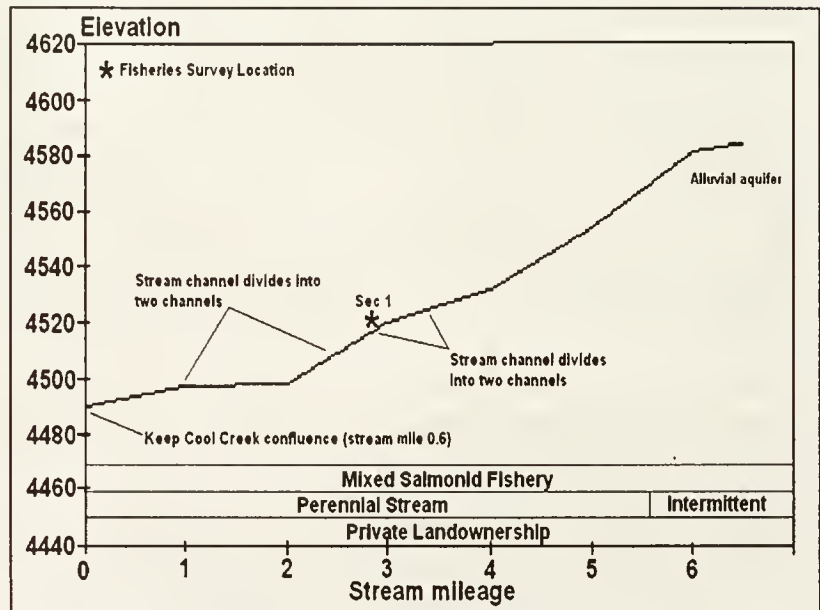
**STATUS:** Completed in summer 2008

**Restoration objectives:** Improve overall habitat conditions, improve spawning and rearing habitat for salmonids, eliminate fish passage barriers, and improve water quality conditions.

**Project Summary:** Lincoln Spring Creek is a large spring creek tributary to Keep Cool Creek, which enters the Blackfoot River at mile 105.2. This 1<sup>st</sup>-order, low-gradient spring creek is ~6.3 miles in length (Figure 23) and originates from an alluvial aquifer under the Lincoln Valley and generates variable base-flow that seasonally rises and falls with the aquifer. The stream flows west through private ranchland and the town of Lincoln before entering Keep Cool Creek at mile 0.6. It is primarily a gravel based stream with a surrounding spruce riparian over-story. Fisheries-related impairments include irrigation practices, heavy livestock grazing and residential impacts and undersized culverts. The activities have suppressed riparian vegetation and contribute to an over-widened and shallow stream channel, fine sediment loading and generally simplified fish habitat.

The Blackfoot Cooperators led by BBCTU are currently reconstructing the upper ~8,000' of Lincoln Spring Creek (mile 2.9 and 4.6). Specific restoration improvements include a more narrow and deepening channel with increased stream sinuosity, placement of instream wood, re-vegetate stream banks, removal of three undersized culverts and irrigation ditch screening. The project hopes to benefit salmonids by reducing temperature and sediment levels and restoring movement corridors.

**Monitoring:** Based on historical accounts, Lincoln Spring Creek once supported bull trout and WSCT. In 2007, we conducted a pre-restoration fish population survey at mile 2.8 in Lincoln Spring Creek (Figure 11). Sampling recorded a brook and brown trout salmonid community with sculpin. Native salmonids were not detected in this or previous Lincoln Spring creek surveys.



**Figure 11.** Longitudinal profile for Lincoln Spring Creek.

## McCabe Creek Restoration Project

**WATER NAME:** McCabe Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 038-97, 031-98, and 018-00

**STATUS:** Completed in 2002

**Restoration objective:** Restore instream flows and habitat conditions for bull trout and WSCT. Eliminate entrainment of WSCT to irrigation ditches

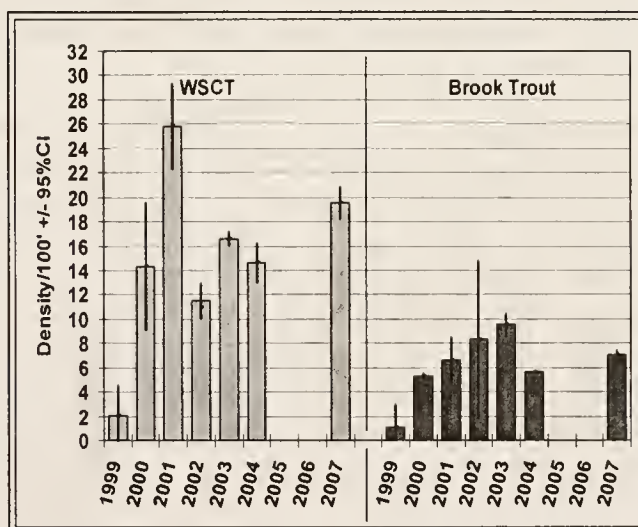
**Project Summary:** McCabe Creek, a cold basin-fed tributary to lower Dick Creek, enters at stream mile 3.8 with a base flow of ~4 cfs. In lower reaches, McCabe Creek passes through a beaver-influenced wetland bog before entering Dick Creek, a lower tributary to Monture Creek. McCabe Creek has a long history of adverse fisheries impacts related to channel alterations and agricultural activities. These include intensive riparian grazing, physical alterations to the channel, poorly designed road crossings, chronic dewatering, and fish losses to irrigation ditches.

A comprehensive restoration project for McCabe Creek began in 1999 and continued through 2002. This project: 1) consolidated four irrigation ditches into one pipeline and screened the intake; 2) converted flood to sprinkler irrigation thereby enhanced stream flows by 3-5cfs; 3) restored habitat conditions including the placement of instream wood and shrub plantings along 1/2 mile of stream; 4) implemented grazing changes and developed off-stream livestock water; and 5) replaced a county road culvert with an open-bottom box culvert. Benefits to fish population relate to increasing stream flows, reducing water temperatures in Dick Creek, eliminating WSCT losses to ditches, and restoring habitat complexity to a damaged stream channel.

### **Monitoring:**

McCabe Creek is a WSCT dominated stream, with brook trout present in lower stream reaches. Due to cool summer temperatures, McCabe Creek likely supported bull trout historically. In 1999, prior to restoration, we established a fish population survey section in a degraded section of stream (mile 2.2), an area of low habitat complexity and chronic low flows.

In 2006, we continued to monitor fisheries at mile 2.2 (Figure 12). Both WSCT and brook trout (age 1 and older) have increased in project area compared to the pre-project (1999) condition. Less encouraging is an increase in brook trout at the monitoring site.



**Figure 12.** Densities of age 1 and older fish in McCabe Creek at mile 2.2, 1999-2007.



## Murphy Spring Creek Fish Screen Project

**WATER NAME:** Murphy Spring Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 011-06

**STATUS:** Completed in 2006

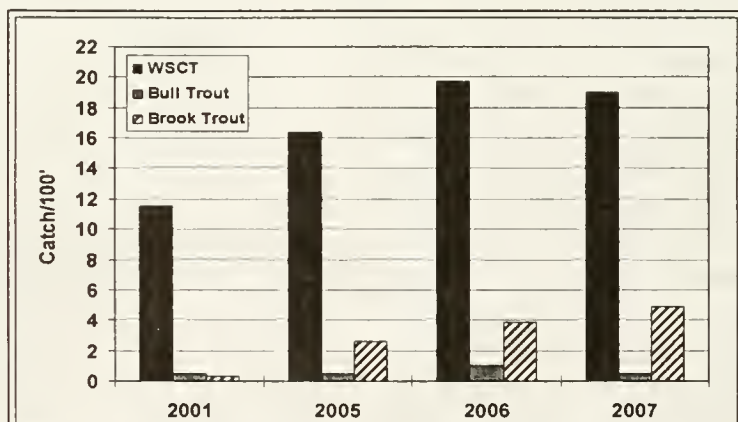
**Restoration objectives:** Restore habitat conditions suitable to WSCT and juvenile bull trout; prevent irrigation ditch losses; maintain minimum instream flows and provide rearing and recruitment for fluvial bull trout and cutthroat trout to the North Fork.

**Project Summary:** Murphy Spring Creek, a small WSCT dominated tributary, originates on the north side of Ovando Mountain and flow six miles south and enters the North Fork at mile 9.9. Murphy Spring Creek has a history of irrigation impacts and fish passage problems. Irrigation problems involve chronic dewatering and entrainment of WSCT to the Murphy ditch at mile 1.8. Fish passage problems involved an undersized culvert at mile 0.5 and the defunct condition of the Murphy diversion. The culvert reduced the upstream movement of juvenile bull trout from the North Fork, while the diversion reduced downstream movement of WSCT from the headwaters to the North Fork through dewatering and entrainment.

The Murphy Spring Creek restoration project began in 1998 with the installation of a new diversion fitted with a Denil fish ladder. In 2000, we replaced the culvert with a larger baffled culvert designed to allow the upstream movement of YOY bull trout. In 2004-05, the Blackfoot Cooperators expanded restoration actions by developing an instream flow agreement that granted habitat maintenance flows as well as a 2.2 cfs minimal instream flow in Murphy Spring Creek. In 2006, a Coanda fish screen was placed in a diversion as a measure to eliminated losses of WSCT.

### **Monitoring:**

Fish population surveys conducted in 2006 and 2007 show a modest increase in numbers for all salmonids. Prior to 2001, bull trout were absent from this location. Brook trout densities have also increased at this site (Figure 13).



**Figure 13.** CPUE for salmonids in Murphy Spring Creek at mile 0.6, 2001-2007.

## Nevada Spring Creek Channel Reconstruction Project

**WATER NAME:** Nevada Spring Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 033-98, 034-98, 035-98, 036-98

**STATUS:** Ongoing

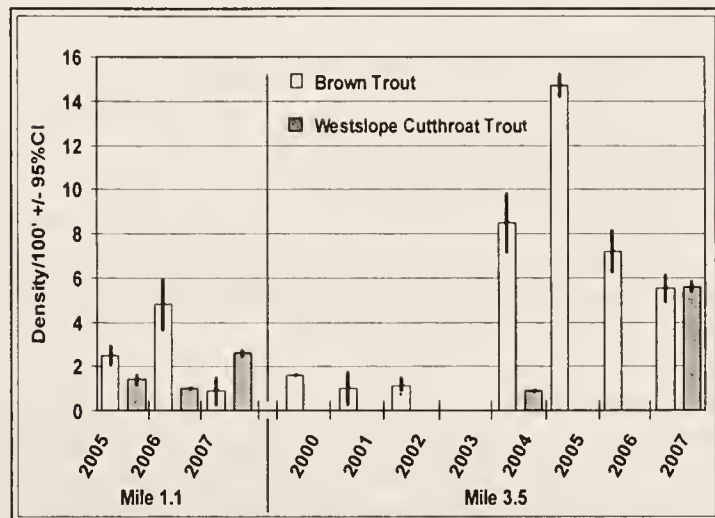
**Restoration objectives:** Restore habitat suitable for cold-water trout; improve downstream water quality, and reduce thermal stress in Nevada Creek and the Blackfoot River.

**Project Summary:** Nevada Spring Creek, a tributary of lower Nevada Creek, originates from an artesian spring and flows through agricultural lands to its junction with Nevada Creek at mile 6.2. The spring source produces between six and nine cfs. Nevada Spring Creek is joined near the source by Wasson Creek, a small, basin-fed tributary that brings an additional base flow of approximately two cfs during the non-irrigation season. Water temperatures at the artesian source are a constant year-around 44°F.

Restoration of Nevada Spring Creek has been ongoing for several years. A habitat restoration project for the entire 4.2 miles of Nevada Spring Creek was completed between 2001 and 2004. The project entailed the complete reconstruction of Nevada Spring Creek, riparian grazing changes, instream flow enhancement, wetland restoration and shrub plantings. Prior to restoration, summer water temperatures in the lower portion of Nevada Spring Creek exceeded >75°F due in part an over-widened channel. This warming and agricultural runoff from adjacent lands contributed to water quality degradation, and created unsuitable habitat conditions for coldwater salmonids in the lower portion of Nevada Spring Creek. A complete before and after summary of channel measurements is located in a previous monitoring report (Pierce et al. 2006).

**Monitoring:** Prior to channel restoration, Nevada Spring Creek supported low densities of brown trout in upper reaches and non-game species (reidside shiners, northern pikeminnow, and largescale sucker) in lower reaches (Pierce et al 2002). WSCT were historically abundant in Nevada Spring Creek based accounts by a long-term landowner.

In 2006 and 2007, we continued post-project fish population monitoring at two sites (mile 3.5 (upper site near the source) and 1.1 (lower site)), and water

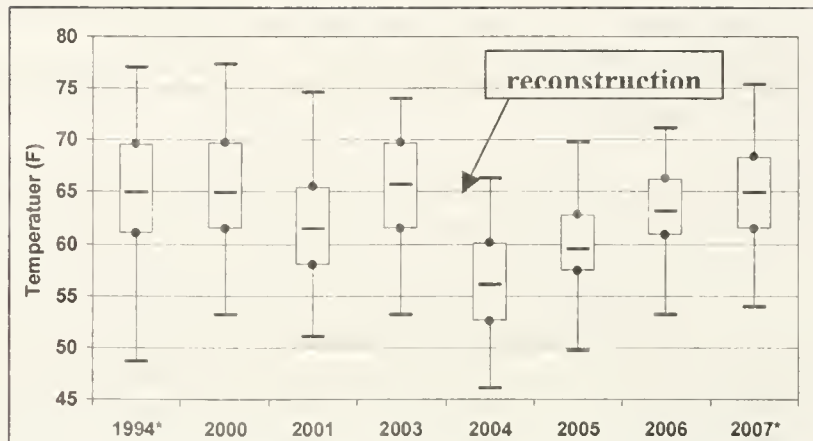


**Figure 14.** Densities for age 1 and older salmonids at two locations on Nevada Spring Creek, 2000-07.

temperatures and whirling disease monitoring near the mouth.

Near the spring source, densities of age I and older brown trout have recently declined; however, WSCT densities show a large recent increase (Figure 14). The brown trout decline appears to relate to a reduction in juvenile recruitment. By contrast, the sharp increase in WSCT densities coincides

with upstream restoration and the screening of fish from two upstream irrigation ditches in Wasson Creek (see Wasson Creek section).



**Figure 15.** July water temperatures for Nevada Spring Creek near the mouth, 1994, and 2000-2007.

Water temperature monitoring near the mouth shows recent increases in water temperature from 2004 through 2007 with temperatures now approaching pre-project levels (Figure 15). These increases began one year after channel reconstruction and result from loss of cooler spring water to off-channel wetland cells. In 2007, the warming exceeded  $>75^{\circ}\text{F}$ . Options to correct to this problem are now being examined. Whirling disease monitoring in 2006 found a mean 1.97 grade infection compared to 2.2 in 2005.

### **Pearson Creek Habitat Restoration Project**

**WATER NAME:** Pearson Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

**FFI NUMBER:** 052-99, 052-00

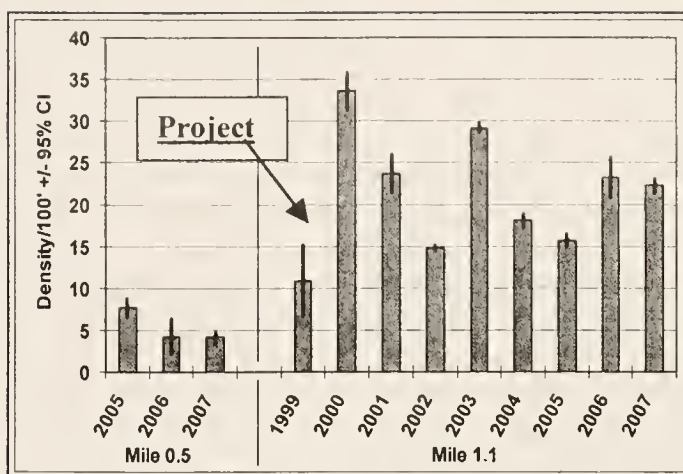
**STATUS:** Completed

**Restoration objectives:** Improve status of WSCT population and increase recruitment of fluvial WSCT to the Blackfoot River.

**Project Summary:** Pearson Creek is a small 2<sup>nd</sup> order tributary to Chamberlain Creek with a base-flow of one cfs. Pearson Creek has a history of channel alterations and adverse irrigation and riparian land management (grazing and timber harvest) practices in its lower two-miles of channel. Beginning in 1994, Pearson Creek has been the focus of a holistic restoration project involving channel reconstruction and instream habitat work, instream flow enhancement (water leasing), conservation easements and riparian grazing changes. Additional riparian grazing improvements completed in 2006 included riparian corridor fencing for the lower two miles of stream, off-stream water developments and armoring a road crossing.



**Monitoring:** Pearson Creek is a fluvial WSCT spawning stream connected to the Chamberlain Creek WSCT population. In 2006 and 2007, we continued fish population monitoring at two sites in lower Pearson Creek. The upstream site (mile 1.1) was established in 1999 prior to instream restoration activities. Following an initial increase between 1999 and 2000, age 1 and older WSCT have remained static at higher densities. In 2005, we established the downstream site (mile 0.5) following the degradation of stream banks by cattle. Fish population sampling results for both sites are summarized in Figure 16.



**Figure 16.** Densities of age 1 and older WSCT in Pearson Creek at miles 0.5 and 1.1, 1999-2007.

### Poorman Creek Channel Restoration Project

**WATER NAME:** Poorman Creek (Blackfoot River)  
**DATA PROVIDED BY:** Ron Pierce, FWP  
**FFI NUMBER:** 052-00, 012-01, 046-02, 020-03, 036-06, 016-07  
**STATUS:** Ongoing

**Restoration objectives:** Improve riparian habitat conditions and enhance instream flows; restore migration corridors; improve recruitment of native fish to the Blackfoot River.

**Project Summary:** Poorman Creek, one of the larger tributaries from the Garnet Mountains, enters the Blackfoot River at river mile 108. Hardrock and placer mining, irrigation dewatering, fish losses to ditches, channel instability, excessive riparian grazing pressure, subdivision impacts and multiple undersized culverts, have impacted Poorman Creek.

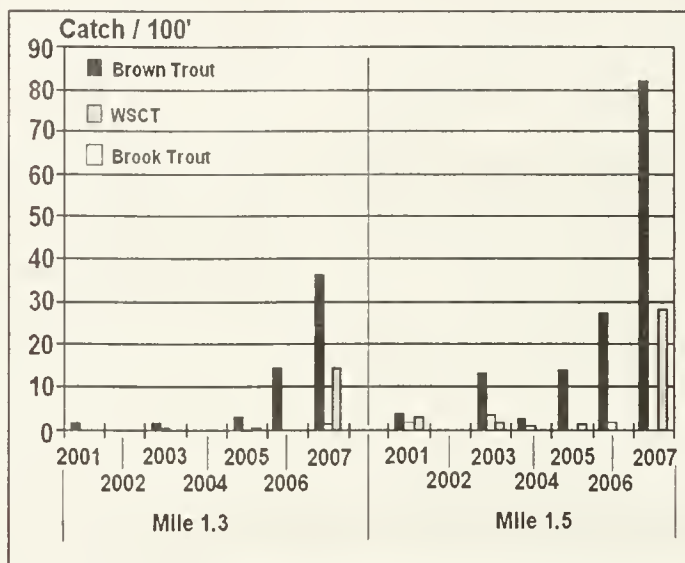
Beginning in 2002 and continuing through the present, a comprehensive restoration projects was implemented on lower Poorman Creek. Restoration projects involved instream flow enhancement and ditch screening through flood-to-sprinkler irrigation conversion, culvert to bridge replacements and riparian grazing changes (corridor fencing, off-stream water) and shrub plantings. Lower Poorman Creek is now entering the passive recovery phase. The recovery of riparian plant communities and improved channel stability now hinges on the continuation of compatible grazing practices, a process expected to take several years. Several upstream culverts were also recently

replaced with structures that allow fish passage on the Stemple Pass County Road through the combined assistance of the Blackfoot Cooperators.

**Monitoring:** Poorman Creek supports genetically pure WSCT, brown trout and brook trout, and is one of only two known Garnet Mountain stream that still supports bull trout reproduction. Native fish densities increase in the upstream direction while non-native fish occupy lower Poorman Creek.

In 2006-07, we repeated fish population surveys at two sites (mile 1.3 and 1.5) in lower Poorman Creek (Figure 17). In 2001, these sites were established up-and downstream of active irrigation diversion and prior to flow enhancement and passive restoration actions. Recent survey results suggest an initial favorable population response for brown trout and WSCT (mostly age 0 fish) up-and downstream of the irrigation conversion project area.

Water temperature and whirling disease monitoring was conducted in 2007 at mile 2.2. Whirling disease identified a sharp increase in the severity of whirling disease with a mean grade infection of 4.69 compared to 0.78 in 2004.



**Figure 17.** CPUE for fish in Poorman Creek at two locations, 2001-2007.

### Rock Creek Ford to Culvert Conversion Project

**WATER NAME:** Rock Creek (Blackfoot River)  
**DATA PROVIDED BY:** Ron Pierce, FWP  
**FFI NUMBER:** 034-07  
**STATUS:** Completed in spring 2008

**Restoration objectives:** Restore migration corridors for native fish; restore natural stream morphology to improve spawning and rearing conditions for all fish using the system.

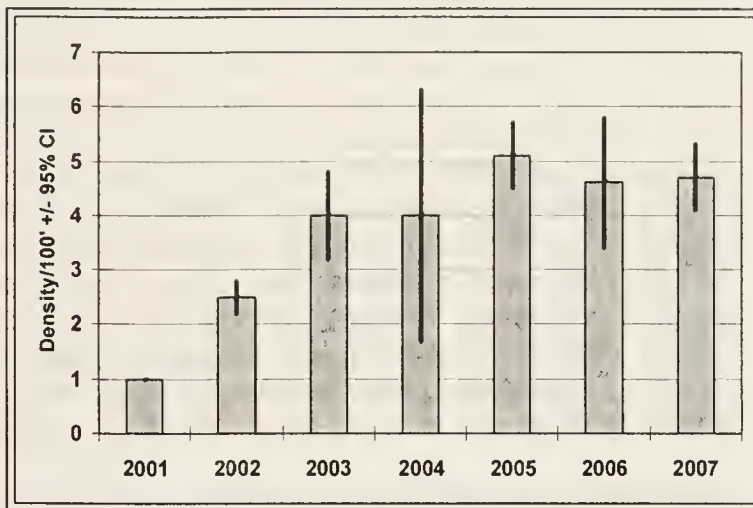
**Project Summary:** Rock Creek, a basin-fed stream over most of its length, receives significant groundwater inflows downstream of mile 1.6. Rock Creek is the largest tributary to the lower North Fork of the Blackfoot River, but has been degraded over

most of its 8.2-mile length due to a wide range of past channel alterations and riparian management activities (Pierce 1990; Pierce et al. 1997, 2006). Rock Creek has also been the focus of continued restoration since 1990. Restoration actions involved working with 13 separate landowners on grazing improvements, instream flow enhancement, and channel reconstruction and revegetation.

“Active” restoration is now completed over the entire length of Rock Creek and its primary tributaries, the South Fork of Rock Creek, Salmon Creek and Dry Creek. From this time forward, project success hinges on the ability of all cooperators to manage instream flows and livestock in riparian areas, while allowing the passive re-colonization of woody riparian plants. Recovery of riparian areas, including plant communities, will take many years.

**Monitoring:** Rock Creek supports a mixed salmonid community. Rock creek provides spawning of brown trout and rainbow trout in lower reaches, a resident brook trout population, limited bull trout rearing and a migration corridor for fluvial WSCT to headwater areas.

In 2006 and 2007, we continued to monitor fish populations in lower Rock Creek (mile 1.6) where the stream was reconstructed in 1999. We also resurveyed fish populations at three upstream sites (miles 3.9, 6.4 and 7.5) established in 1994 or 1996. We also monitored water temperatures at a site established upstream of the gaining reach (mile 1.7) to identify whether restoration actions have influenced water temperature conditions across Kleinschmidt Flat.



**Figure 18.** Densities of age 1 and older brown trout in Rock Creek at mile 1.6, 2001-2007.

Following a period of increase, fish population surveys in lower Rock Creek (mile 1.6) show a stable brown trout-dominated community with no significant changes in densities in the last few years (Figure 18). At this site, bull trout were recorded in 2006 for the first time since 2001. Surveys at the three upstream monitoring sites recorded low densities of WSCT and brown trout at all three survey locations. Brook trout were found at all sampling locations. In 2007, we identified moderate densities of age-0 *Oncorhynchus* (presumed WSCT) in moderated densities at the mile 6.4 sampling location.

July 2007 water temperatures at mile 1.7 show continued high water temperatures problems (>80°F) on Kleinschmidt Flat. These temperatures clearly demonstrate the need for the continued passive recovery of woody plants along the channel.



## Snowbank Creek Diversion Modification Project

**WATER NAME:** Snowbank Creek (Blackfoot River)

**DATA PROVIDED BY:** Ron Pierce, FWP

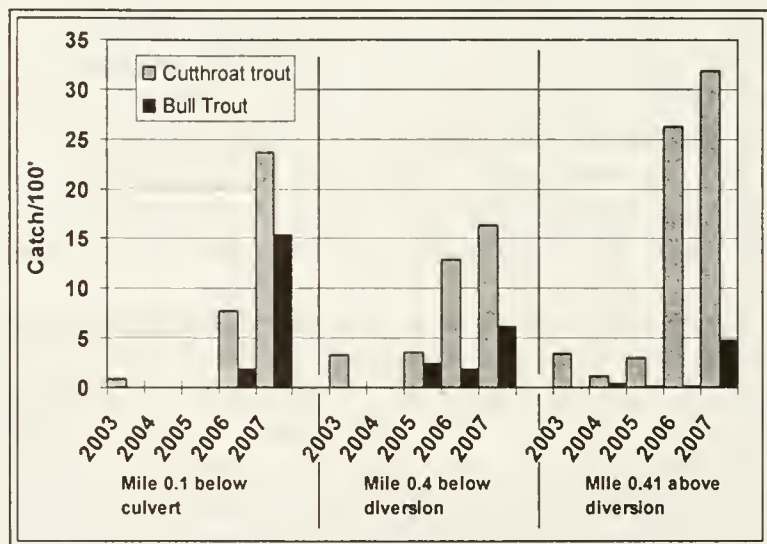
**FFI NUMBER:** 025-08

**STATUS:** Completed

**Restoration objectives:** Restore migration corridor for native fish; enhance instream flows; eliminate loss of bull trout and WSCT to irrigation ditch; improve recruitment of native fish to Blackfoot River.

**Project Summary:** Snowbank Creek is a 1<sup>st</sup> order tributary that flows 4.4 miles through the Helena National Forest and enters Copper Creek at mile 5.9. Snowbank Creek was identified as fisheries impaired in 2003 during an assessment of a defunct diversion at mile 0.4. The Snowbank diversion was constructed in 1962 to divert water to create a put-and-take fishery at Snowbank Lake. We identified fisheries impairments in lower Snowbank Creek to include: 1) native fish entrainment from a diversion to Snowbank Lake; 2) fish passage problems at the diversion and a culvert near the mouth; 3) dewatering below the diversion; and 4) the lack of a legitimate water right that would allow the legal use of Snowbank Creek water for Snowbank Lake (Pierce et al 2004, 2006). Because of the water right problem, the diversion to Snowbank Lake was closed in 2005. In 2007, the USFS obtained a water right that allows the filling of Snowbank Lake. This right provides for restored fish passage, fish screening at the diversion and a minimal instream flow of 4 cfs in lower Snowbank Creek during base-flow periods.

**Monitoring:** In August 2006 and 2007, we continued fish population surveys near the mouth (mile 0.1) and up-and downstream of the diversion (located at mile 0.4) at monitoring sites established in 2003. Our surveys identify both WSCT and bull trout densities have increased sharply with enhanced stream flows (Fig.19). Juvenile bull trout absent from original surveys have now recolonized lower Snowbank Creek. Sampling above the diversion also recorded higher YOY densities for both native species, in



**Figure 19.** CPUE for native fish at three locations on Snowbank Creek, 2003 – 2007.

addition to finding an adult bull trout that negotiated its way passed the diversion. The presence of adult bull trout during the pre-spawning period and YOY above the diversion suggests bull trout reproduction may be occurring.

### **Warren Creek Channel Restoration Project**

**WATER NAME:** WarrenCreek (Blackfoot River)  
**DATA PROVIDED BY:** Ron Pierce, FWP  
**FFI NUMBER:** 036-00  
**STATUS:** Completed

**Restoration Objectives:** Restore riparian vegetation and stream habitat for all life stages of trout; improve spawning and rearing conditions; increase recruitment of trout to the middle Blackfoot River; moderate the influence of whirling disease.

**Project Summary:** Warren Creek, a small tributary to the middle Blackfoot River, originates on Ovando Mountain and flows 12 miles southwest through knob-and-kettle topography to its confluence with the Blackfoot River at rm 50. Warren Creek water is used for irrigated hay production and livestock watering. Irrigation causes the middle section of Warren Creek to dewater, although the lower section gains inflow from springs and maintains perennial base-flows of 3-5 cfs. Some riparian areas in mid-to-lower Warren Creek were cleared, heavily grazed, dredged and historically straightened in some cases with dynamite. These actions all contribute to extensive degradation of salmonid habitat over the length of Warren Creek.

Since 1995, Warren Creek has been the focus of extensive restoration actions. The actions involve removal of several streamside corrals, implementation of grazing plans, shrub planting, several miles of channel reconstruction, instream flow enhancement near the mouth, wetland restoration and the enrollment of private landowners in conservation easement programs. In 2006 a re-entry into a channel reconstruction project (between mile 5.1 and 6.8) was needed to correct channel incision problem in a newly constructed segment of Warren Creek.

**Monitoring:** In 2006 and 2007, FWP continued to monitor fish populations at five locations (miles 8.2, 6.7, 3.6, 2.1 and 1.1), all in areas of previous restoration actions (Figure 20).

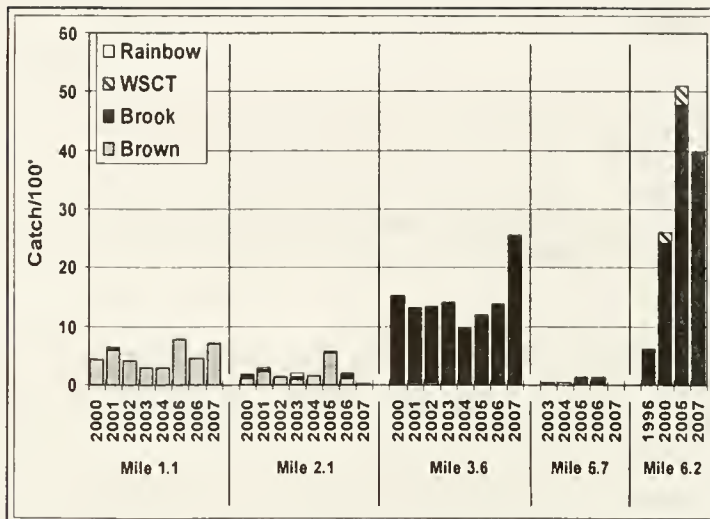
The mile 8.2 monitoring site was established in 1995 to monitor fish population response to a riparian grazing project. Since grazing exclusions were put into effect, the stream has evolved from an “F” channel to a more stable “E” channel and fish population densities have increased in response to favorable habitat changes. Monitoring at this site shows a high level of success.

Fish population surveys conducted at mile 6.7 includes two years of pre-restoration baseline (2003 and 2004) and three years of post-restoration monitoring (2005-2007). Sampling in 2006 revealed very low densities of brook trout, and in 2007 we found no

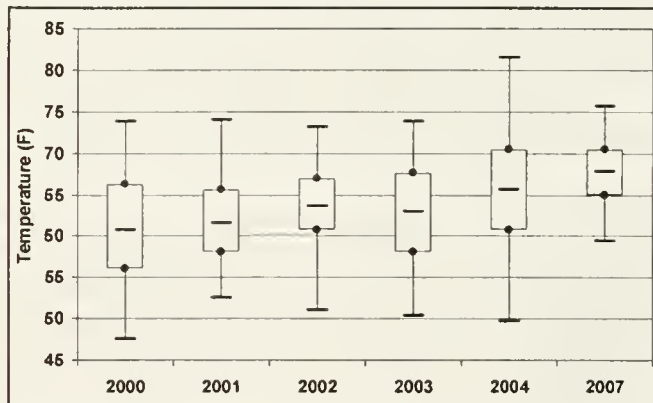
fish within the monitoring section. During the 2007 fish population survey, cattle grazing impacts were observed in this project area. Thus, this section of Warren Creek continues to suffer degradation to the banks, vegetation and channel despite attempts at restoration.

The three downstream monitoring sites (mile 3.6, 2.1 and 1.1) are in an area of channel reconstruction and grazing enclosures completed in 2000. Fish populations at these sites have remained generally static; however, we recorded a recent decline in densities at mile 2.1, due perhaps to channel dewatering caused by beaver. We continue to observe suspected clinical signs of whirling disease (opercular deformities) in a high percentage of sampled brook trout throughout Warren Creek.

Water temperature monitoring at mile 1.1 suggest Warren Creek is warming with summer temperatures ( $>75^{\circ}\text{F}$ ) in exceeding levels considered stressful to salmonids (Figure 21). These results identify a need to establish woody species and/or identify irrigation-related options to cool the stream.



**Figure 20.** CPUE for salmonids at five sites in Warren Creek, 2000-2007.



**Figure 21.** July water temperatures for lower Warren Creek (mile 1.1), 2000-2007.



# Clark Fork River Drainage

## Upper Willow Creek Channel Restoration Project

**WATER NAME:** Upper Willow Creek (Clark Fork River)  
**DATA PROVIDED BY:** Mark Lere and George Liknes, FWP  
**FFI NUMBER:** 022-05, 019-06  
**STATUS:** Completed in 2007

**Restoration Objectives:** The goal of the Upper Willow Creek Restoration Project was to restore a nearly 2-mile reach of degraded stream channel and to protect the restoration effort from future adverse land use activities for a minimum of 20 years.

**Project Summary:** Upper Willow Creek (Granite County) is reportedly the most important cutthroat spawning stream in the upper Rock Creek drainage. The stream is severely degraded and incised due to previous agricultural practices. This project included restoring about 6500 ft of stream. Restoration included reconstruction of the channel, installation of natural habitat features, rebuilding of stream crossings and irrigation structures to a more fish friendly design, and comprehensive revegetation of riparian areas.

This completed project restored the dimension, pattern and profile of 9,500 feet of the altered reach by constructing a more narrow and deeper channel that meandered through the floodplain for approximately 12,700 feet. The project increased channel length by approximately 34% and reconnected the channel to the flood plain.

In addition to restoration of the channel form, the project restored the riparian vegetative community by transplanting approximately 400 live willow clumps along the newly constructed channel, installing approximately 12,000 willow sprigs obtained from nearby sources within the drainage along the stream margin, and entering into a project agreement with the landowners stipulating that the riparian corridor will be excluded from grazing for a minimum of 15 years, followed by careful riparian management for a minimum of 5 years thereafter.

**Monitoring:** Fish population estimates for brown trout (*Salmo trutta*) and rainbow trout  $X$  westslope cutthroat hybrids (*Oncorhynchus mykiss X Oncorhynchus clarki lewisi*) are shown in Figure 22. Capture efficiencies typically were lower during 2007 than 2006, resulting in mostly wider confidence intervals around the point estimates. Non-overlapping confidence intervals were considered statistically significant for this report. Comparisons of trout abundance between sections, standardized to 1,000 feet, indicate that, at least in the short term, habitat quality may not have been significantly improved as a result of the restoration work. However, salmonid populations have been shown to be dynamic and natural fluctuations in abundance can be large (Platts, Nelson 1988). Two years of abundance data simply are not adequate to assess the potential for changing population trends as a result of this habitat restoration effort.

A metric for abundance not influenced by natural population variation is the measure of the quantity of habitat. For this restoration project, the quantity of habitat was increased by 34% in terms of stream length. Assuming habitat quality was not degraded as a result of this habitat restoration effort, fish abundance likely has increased in proportion to stream length.

Other fish species collected while sampling included two longnose suckers (*Catostomus catostomus*) during 2006 and a single brook trout (*Salvelinus fontinalis*) during 2007.

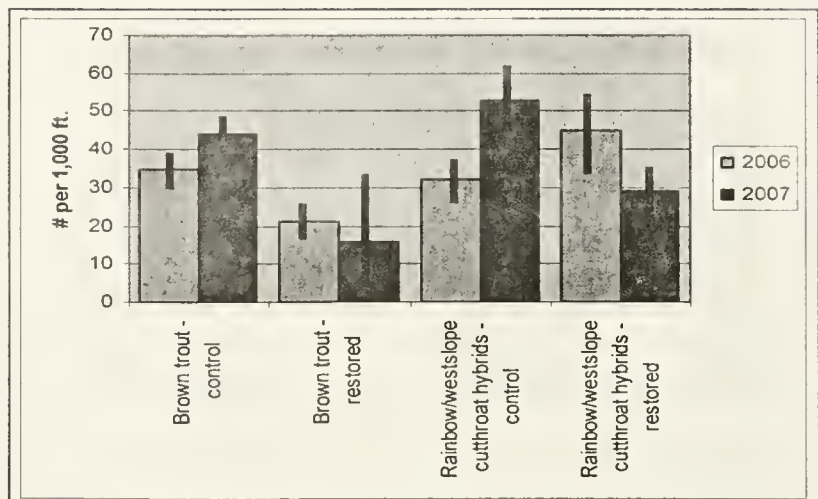


Figure 22. A comparison of estimated numbers of trout greater than 75 mm in total length between a control and restored reach of Upper Willow Creek, Montana. Bars represent 95% confidence intervals

## Jefferson River Drainage

### Sappington Spring Creek Spawning Channel Project

**WATER NAME:** Sappington Spring Creek (Jefferson River)  
**DATA PROVIDED BY:** Ron Spoon, FWP  
**FFI NUMBER:** 024-2002  
**STATUS:** Completed in fall 2005

**Restoration Objectives:** To provide spawning habitat for Jefferson River rainbow and brown trout.

**Project Summary:** Sappington Spring (Gallatin County) enters the Jefferson River near the town of Willow Creek. This spring has the potential to provide spawning habitat for Jefferson River rainbow and brown trout but the outlet was presently perched about 4 feet above the river. This project involves improving habitat within the spring creek, lengthening the channel by about 1,200 ft, and re-connecting the spring creek with the river to allow Jefferson River fish to enter the spring.

**Monitoring:** One brown trout redd was observed soon after construction in 2005 and five redds were observed in 2006. No rainbow trout redds were observed in spring 2006. Rainbow trout eggs from Willow Springs were imprinted in 2006 and 2007, and moderate abundance of juvenile brown and rainbow trout was observed in the fall CPUE survey.

## Willow Springs Creek Spawning Habitat Enhancement Project

**WATER NAME:** Willow Springs Creek (Jefferson River)

**DATA PROVIDED BY:** Ron Spoon, FWP

**FFI NUMBER:** 034-04

**STATUS:** Completed in spring 2005

**Restoration Objectives:** To improve spawning habitat for Jefferson River resident rainbow trout.

**Project Summary:** Willow Spring Creek (Jefferson County), located on the Joe Adams property, is an important spawning stream for Jefferson River rainbow trout. A scarcity of suitable spawning sites is presently limiting the fishery. Spawning habitat was improved by importing gravel into the spring creek as well as into several smaller tributaries. The project also includes channel improvements and riparian fencing. About 4,500 ft of channel were treated.

**Monitoring:** Initial habitat improvement took place in 1987 and additional improvements were made in April 2005. No rainbow trout were observed in this tributary in the mid-1980's, and the first spawning took place in 1991 (three years after imprinting rainbow trout from Hell's Canyon Creek). Fry production after habitat improvement and imprinting was significantly improved by the project, and an increase in the number of

rainbow trout residing in the Jefferson River near Willow Springs was observed throughout the 1990's. Redd counts for rainbow trout spawning in Willow Springs show a progressive increase since 1991 (Fig. 23) and a general increase in juvenile rainbow trout accompanied the increased number of redds (Fig. 24).

The abundance of age 0 rainbow trout frequently exceeded 3.0 fish per 100 seconds, which was among the highest density of all tributaries surveyed. Four years of egg collection (approximately 10,000 eggs per year) from the Willow Springs spawning run (2004 –2007) have not impacted juvenile rainbow trout abundance based on CPUE result (Figure 24).

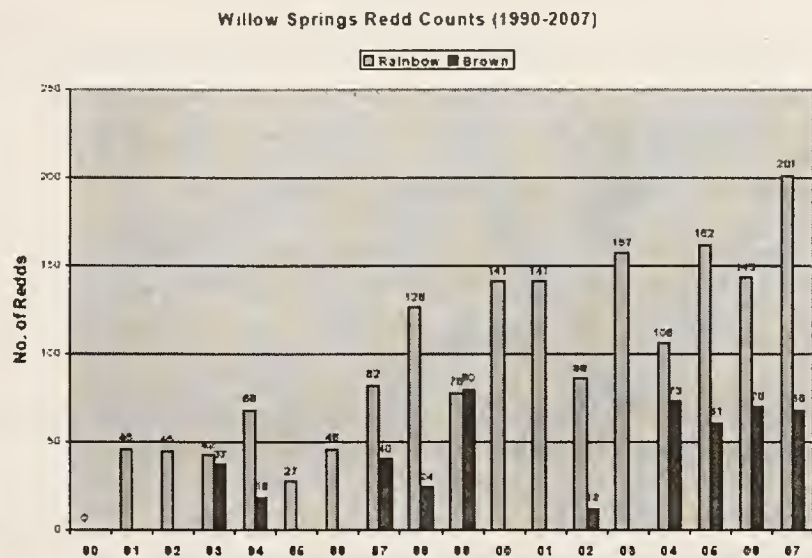


Figure 23. Brown and rainbow trout redd counts in Willow Springs from 1990 to 2007.



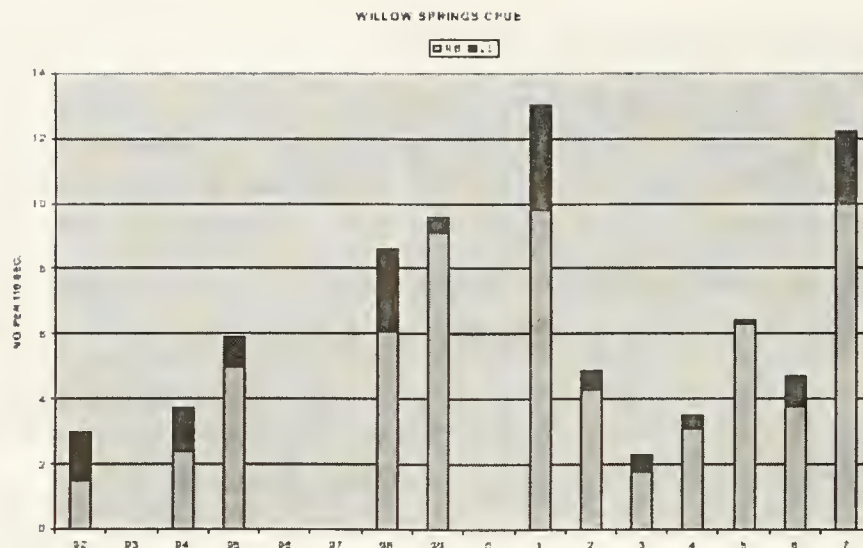


Figure 24. Brown and rainbow trout CPUE trend in Willow Springs (1992-2007).

### **Antelope Creek Channel Restoration Project**

**WATER NAME:** Antelope Creek (Jefferson River)

**DATA PROVIDED BY:** Ron Spoon, FWP

**FFI NUMBER:** 001-05

**STATUS:** Completed in winter 2005.

**Restoration Objectives:** To increase recruitment of brown and rainbow trout in the Jefferson River.

**Project Summary:** Antelope Creek (Madison/Jefferson Counties) enters the Jefferson River about 2 miles upstream from Sappington Bridge. The Jefferson supports populations of brown and rainbow trout and is judged by fishery biologists to be recruitment limited. This project involved restoration of approximately 5,400 ft. of Antelope Creek and occurred immediately upstream from its confluence with the Jefferson River. The project included building approximately 1,000 ft of new meandering channel where the stream had previously been channelized; narrowing and deepening portions of the channel to improve sediment transport and create better habitat; redesign of channel geometry including construction of additional pools and installation of bed control structures to beneficially influence scour; water conservation resulting from replacement of an existing diversion structure with a more efficient center pivot system; and riparian fencing that created a 70-acre riparian pasture. Grazing will be managed to protect the investment in restoration.

**Monitoring:** Channel reconstruction and the elimination of an irrigation canal occurred in fall/winter of 2005. Five brown trout redds were observed in the project area in 2006.

## Parson's Slough Spawning Habitat Enhancement Project

**WATER NAME:** Parson's Slough River (Jefferson River)

**DATA PROVIDED BY:** Ron Spoon, FWP

**FFI NUMBER:** 013-05

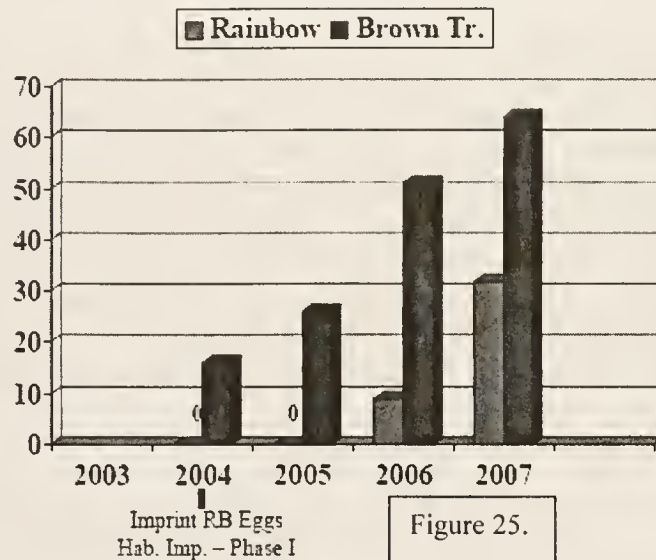
**STATUS:** Completed in 2007

**Restoration Objectives:** To increase spawning habitat for Jefferson River resident brown and rainbow trout.

**Project Summary:** Lower Parson's Slough (Madison County) enters the Jefferson River near Waterloo. The Jefferson supports a mixed salmonid fishery and spawning is limited to due dewatering and a lack of suitable tributaries. This project involved construction of a 2,000 ft. spawning channel that will receive irrigation return flow from Parson's Slough during the spawning and incubation season for brown trout.

**Monitoring:** Habitat improvement and imprinting rainbow trout eggs resulted in the first juvenile rainbow trout observed in this spring creek in 2004. Successful imprinting of rainbow trout eggs from Willow Springs in 2006 resulted in one of the highest catch rates of juvenile rainbow trout observed in any tributary surveyed in the Missouri River and Jefferson River. Additional habitat improvement was conducted during 2007 in Parson's Slough using funds from FFIP and other sources. The trend for brown trout is positive, and rainbow trout returning to Parson's Slough after imprinting was first documented in 2006 (Fig. 25).

### PARSON'S SLOUGH REDD COUNTS



## Judith River Drainage

### South Fork Judith River Fish Passage Barrier Project

**WATER NAME:** South Fork Judith River (Judith River)

**DATA PROVIDED BY:** Dave Moser, FWP

**FFI NUMBER:** 027-03

**STATUS:** Completed 2006

**Restoration Objectives:** The South Fork Judith River (Judith Basin County), particularly in its upper reaches, supports a nearly genetically pure population of westslope cutthroat trout. A major cause for the decline of cutthroat populations throughout the west is hybridization with rainbow trout and competition from other non-natives such as brook trout. This project involved construction of a relatively large barrier that will protect cutthroat in the upper 25 miles of the drainage.

**Project Summary:** In 2006, 2007, and 2008 hybrids and brook trout were suppressed from approximately 16 miles of the mainstem South Fork and tributaries (Smith, Cross, Russian, Bluff Mountain, Cabin, and Deadhorse creeks). Approximately 15,000 fish were removed. In 2007 approximately 5,000 hatchery westslope cutthroat trout (Anaconda M012) were stocked in the mainstem South Fork. In 2008, 15,000 WCT were stocked, 12,000 in the mainstem SF and, 1,000 in Smith Creek and 3,000 in Cabin Creek. Stocking will continue for at least three more years. The aim of the stocking is to swamp out the bulk of the remaining introgression in the lower and mid SF drainage. The upper reaches of the SF and its headwater tributaries contain slightly introgressed WCT. The goal is to maintain the SF fishery above the barrier at > than 95 % purity.

**Monitoring:** Project is still ongoing.

## Marias River Drainage

### Tiber Reservoir Perch Habitat Project

**WATER NAME:** Tiber Reservoir (Marias River)

**DATA PROVIDED BY:** Dave Yerk, FWP

**FFI NUMBER:** 060-98, 044-06, 039-07

**STATUS:** Continuing

**Restoration Objectives:** To increase yellow perch recruitment in Tiber Reservoir which is currently limited by a lack of structure for spawning and rearing.

**Project Summary:** This project involves placement of weighted Christmas tree reefs in known spawning areas located in the Willow Creek Arm. Nearly 700 Christmas tree



structures were placed at four locations in the Willow Creek Arm of Tiber Reservoir on March 1, 2008. Great Falls Chapter of Walleyes Unlimited and North Middle School Fishing Club provided volunteer help in deploying the structures.

**Monitoring:** Follow-up evaluation of this habitat project included ongoing forage fish production monitoring. Forage fish monitoring was completed on Tiber Reservoir from August 18-21, 2008, using a 100- x 10-foot beach seine with 0.25-inch mesh. Sixty-two standardized sites were sampled and catches were identified and enumerated by species. Eight different fish species totaling 24,590 individuals were sampled. Fish species sampled included yellow perch, walleye, northern pike, spottail shiner, emerald shiner, common carp, lake chub and white sucker. Catch-per-unit-effort (CPUE) of spottail shiners was highest at 296.18 per seine haul, followed by common carp at 50.73 and white sucker at 25.94. CPUE of yellow perch, the target species of this project, was 11.06 and showed no measurable increase or decline from recent years (Figure 26).

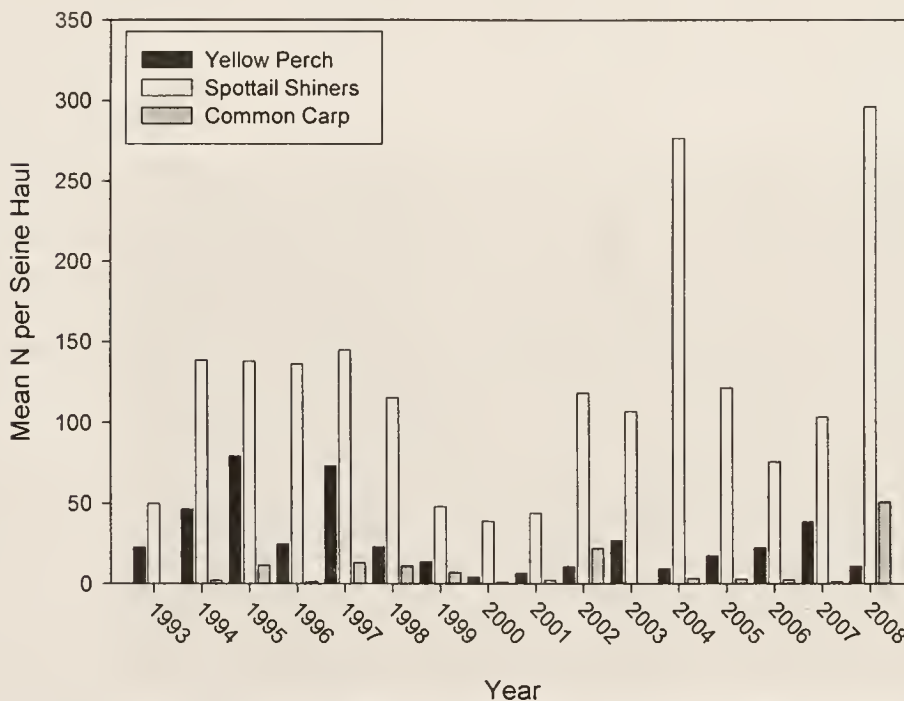


Figure 26. Mean number of forage fish sampled in beach seine hauls in Tiber Reservoir, Montana, 1993 – 2008.

Further monitoring of this reservoir habitat project was attempted on May 3, 2008, when six members of the Electric City Dive Club out of Great Falls used SCUBA gear to visually inspect the structures for the deposition of yellow perch egg skeins. Diving conditions were very difficult during these efforts; water clarity was minimal and cold water temperatures limited the amount of time the divers could stay in the water. No egg skeins were observed on the structures, but these efforts were not conclusive because of the poor conditions.

# Missouri River Drainage

## Deep Creek Off-Channel Livestock Water Project

**WATER NAME:** Deep Creek (Jefferson River)

**DATA PROVIDED BY:** Ron Spoon, FWP

**FFI NUMBER:** 007-04

**STATUS:** Completed in 2005.

**Restoration Objectives:** To improve spawning habitat for Missouri River resident rainbow trout.

**Project Summary:** Portions of Deep Creek (Broadwater County) located on the Hahn Ranch suffer from riparian degradation caused by grazing and loss of fish into an irrigation diversion. This project involves irrigation improvements that will eliminate the diversion and off-stream watering that will improve the distribution of cattle and reduce riparian grazing.

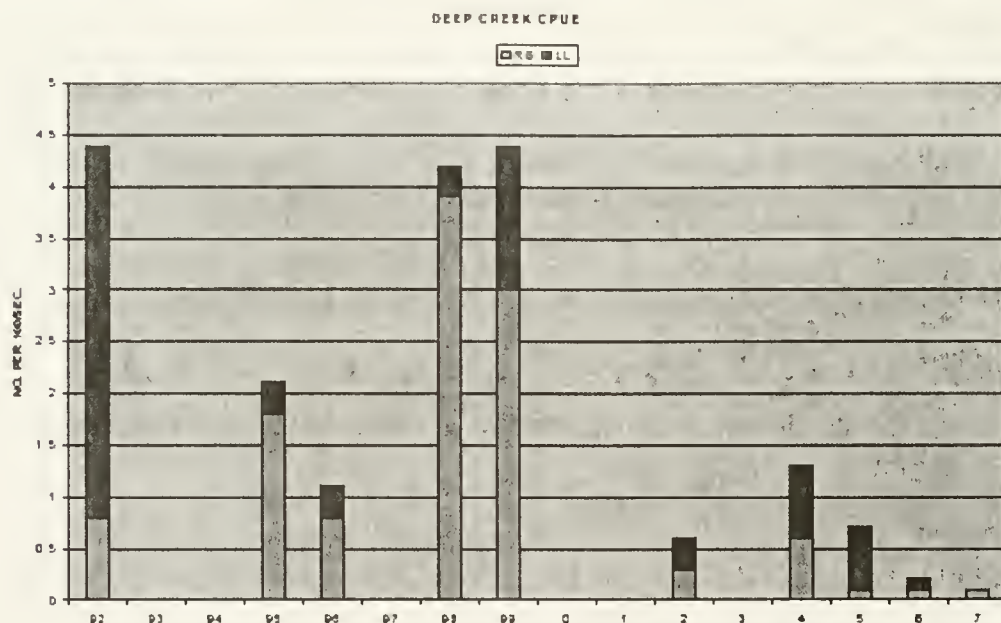


Figure 27. Brown and rainbow trout CPUE trend in Deep Creek (1992-2007).

**Monitoring:** Low streamflow has reduced rainbow trout fry abundance compared to the mid-1990's, and effects of whirling disease also appear to impact spawning success based on the declining trend in CPUE and the frequent observations of fish with deformities.

# Yellowstone River Drainage

## Soda Butte Creek Brook Trout Removal Project

**WATER NAME:** Soda Butte Creek (Yellowstone River)

**DATA PROVIDED BY:** Jim Olsen, FWP

**FFI NUMBER:** 048-2004

**STATUS:** Ongoing

**Restoration Objectives:** To protect pure-strain Yellowstone cutthroat trout from hybridization with eastern brook trout.

**Project Summary:** Soda Butte Creek (Park County), which flows into Yellowstone Park near Cook City, supports an important population of Yellowstone cutthroat trout. However, a small un-named tributary near the headwaters supports an abundant brook trout population that threatens the cutthroat. This project involved treating the un-named tributary with the piscicide antimycin to control brook trout numbers. Chemical removal of brook trout occurred in September 2004, after tests determined the appropriate chemical and concentration needed. The preferred piscicide for this project was antimycin, a fungicide that is extremely toxic to fish at very low concentrations. Testing with antimycin in the unnamed tributary indicated it was not effective at the maximum application rate of 10 parts per billion (ppb), so, our alternative chemical, rotenone, was tested. Rotenone was effective at a concentration of 1 part per million (ppm). Potassium permanganate (KMnO<sub>4</sub>) was used to detoxify the rotenone and prevent the treated waters from going beyond the treatment area. The entire length of stream (approximately 1 mile) was treated twice during the week of September 6<sup>th</sup>. More than 950 brook trout were removed from the unnamed tributary upstream from the Highway 212 culvert.

In July 2005, subsequent electrofishing in the unnamed tributary found one brook trout in the treated reach of the creek. The entire length of the unnamed tributary was electrofished a second time in August of 2005, and no brook trout were present. The creek will be electrofished one more time during 2006 to determine if brook trout are present in the stream, and if the chemical removal portion of the project was successful.

**Monitoring:** YNP fisheries crews perform annual population estimates in Soda Butte Creek. Their population section begins at the YNP border and extends downstream. During the 2004 survey, they also removed five brook trout in their section and in spot-electrofished areas downstream. In 2005, electrofishing was extended within YNP to the first highway bridge over Soda Butte Creek, approximately 3.5 miles. It was unclear from previous work how far into YNP brook trout extended. Our data, in conjunction with that from YNP, suggests brook trout decline precipitously from the park boundary downstream. Only 2 brook trout were captured from the Warm Springs picnic area downstream to the highway bridge. It is unclear, however, whether or not the expansion of brook trout has reached into the park, or whether habitat conditions are more favorable for brook trout outside the park.

Large numbers of brook trout present near Sheep Creek indicate colonization and use of



the lower reaches as a spawning area. Sheep Creek was sampled in its entirety in 2004, and 2 electrofishing passes were made from Soda Butte Creek to the Highway 212 culvert. Only one YCT (3.4 in) was captured. Sheep Creek upstream of Highway 212 to the falls was electrofished, and 9 YCT were captured ranging from 6-14 in. No brook trout and only one juvenile YCT were captured, so it is not likely that this tributary is being used for spawning by either species.

Woody Creek was also sampled from the bridge near Cooke City upstream approximately 0.3 miles. No brook trout were captured in the creek, but 76 YCT were, ranging in size from 4.7-13.7 in.

In 2004, a redd count was performed from Sheep to Guitar Creek to determine brook trout spawning. One brook trout redd was found and destroyed. During the redd survey, 2 small spring-fed tributaries were identified upstream of Guitar Creek—South Moose Meadow Creek on the south side and North Moose Meadow Creek originating approximately one-fourth mile upstream on the north side. Brook trout were seen in South Moose Meadow Creek, but none in the north creek. These streams were part of the electrofishing removals in 2005 when 29 brook trout were removed from South Moose Meadow Creek, and one brook trout from North Moose Meadow Creek. Warm Spring Creek in YNP was also sampled, and no brook trout were found. It appears from the data that the major tributaries to Soda Butte Creek do not contain brook trout, but the smaller spring-fed streams may be important brook trout habitats.

The last time these reaches of Soda Butte Creek and its tributaries were sampled was 1994. At that time, no brook trout were found downstream from Cooke City. Our data suggest the brook trout population has expanded greatly over the past decade and is no longer limited to the headwaters of the stream upstream of the McClaren Tailings. Natural reproduction has been documented downstream of Cooke City in the area between Sheep and Guitar creeks, and the offspring are migrating to other reaches of the Soda Butte Creek drainage. The increase in brook trout densities in this reach could be related to lower gradient and smaller substrate more suitable for spawning, or to the addition of the relatively pristine waters from the Sheep Creek drainage. The reason for greater fish density is unclear, but the data from 2004 and 2005 indicate this reach and that from Guitar Creek to Silvergate are where the majority of brook trout reside and where spawning is occurring. In order to mechanically remove brook trout, spawning must be eliminated. This has not occurred in two years of removal efforts, but substantial progress has been made in removing adult and juvenile fish, and in identifying the distribution of brook trout in order to direct future removal efforts. The reduction of brook trout numbers should also reduce their expansion into other areas within YNP. The current healthy status of the YCT population in the creek should give them a competitive advantage over the brook trout.

## Goose Creek Brook Trout Removal Project

**WATER NAME:** Goose Creek (Yellowstone River)

**DATA PROVIDED BY:** Jeremiah Wood, FWP

**FFI NUMBER:** 007-07

**STATUS:** Ongoing



Figure 28. Map of Goose Creek and surrounding area.

**Restoration Objectives:** Goose Creek is a tributary to the upper Stillwater River in the mid-Yellowstone River drainage, near Cooke City, MT. Once a native Yellowstone cutthroat trout stream, Goose Creek was historically stocked with brook trout, which have taken over a large portion of the drainage. Goose Lake, at the head of the drainage, harbors a healthy population of pure Yellowstone cutthroat trout that now serves as the broodstock for MTFWP's YCT hatchery program. A natural cascade barrier has kept brook trout from invading Goose Lake in the past. Below this barrier, six miles of stream and three lakes contained a large brook trout population, with another cascade barrier present at their lower extent. The objective of this project was to remove brook trout from this six mile reach of stream and three lakes and replace them with pure Goose Lake strain YCT.

**Project Summary:** In the summers of 2007 and 2008, the lakes and creek were treated with the chemical rotenone via drip stations, gasoline-powered pumps, and backpack sprayers. Extensive use of a helicopter was needed to transport crews and equipment to the site due to the logistically challenging site location. Thousands of brook trout were removed in 2007, and a repeat treatment in 2008 resulted in the removal of a few dozen more brook trout that had been missed during the first treatment.

**Monitoring:** It appears that brook trout removal in the Goose Creek drainage was very successful, but not necessarily 100% complete. Therefore, we will likely propose to treat the area a third time in 2009 to guarantee success. In addition, a helicopter flight over the

Stillwater River downstream from the mouth of Goose Creek revealed a natural barrier waterfall, which presents the opportunity to remove brook trout from an additional 3-5 miles of stream, substantially increasing the number of YCT stream miles in the upper Stillwater River basin. We will pursue chemical treatment of Goose Creek and the upper Stillwater as a simultaneous brook trout removal project in 2009.

### **Thiel Creek Fish Barrier Project**

**WATER NAME:** Thiel Creek (Yellowstone River)

**DATA PROVIDED BY:** Jeremiah Wood, FWP

**FFI NUMBER:** 021-07

**STATUS:** Completed in 2008

**Restoration Objectives:** Thiel Creek (Carbon County), located NE of Red Lodge, has been selected as a refuge stream for genetically pure Yellowstone cutthroat trout. Brook trout have been removed from the stream above a natural temporary barrier. This project involved construction of a permanent barrier on Thiel Creek. The hope is to use this stream to sustain Yellowstone cutthroat from nearby streams that were damaged during the Derby Mountain fire.

**Project Summary:** As part of an effort to rescue YCT from Lower Deer Creek following the 2006 Derby Fire, fish were transferred from Lower Deer Creek and stocked into Thiel Creek. To make the creek suitable for Yellowstone cutthroat trout, brook trout had to be removed from Thiel. After it was determined that there were no natural barriers to upstream fish movement in Thiel Creek, a concrete barrier structure was created on private land approximately 3-4 miles downstream from its headwaters and brook trout were removed from the creek via backpack electrofishing. Yellowstone cutthroat trout were again transferred from Lower Deer and brook trout removal efforts continue.

It now appears that the fire effects do not pose a significant threat to the Lower Deer Creek YCT population, but recent genetics testing has shown that hybridization with rainbow trout now threatens this population. This indicates that Thiel Creek, as well as other possible refuge areas, remains very important to YCT restoration in the area. A long term solution to protect the Lower Deer Creek YCT population from hybridization and possible extinction includes building a barrier to prevent upstream movement by hybrids and nonnatives, and piscicide treatment above the barrier. This project would likely include using Thiel Creek fish as a donor source of YCT for reintroduction after treatment. Short term future work also includes transferring more YCT from Lower Deer Creek to Thiel Creek and exploring alternate means of brook trout removal above the barrier.

**Monitoring:** Will begin in 2009.



## **Emigrant Spring Creek Channel Restoration Project**

**WATER NAME:** Emigrant Spring Creek (Yellowstone River)

**DATA PROVIDED BY:** Carol Endicott, FWP

**FFI NUMBER:** 009-04

**STATUS:** Completed in 2005

**Restoration Objectives:** This project involved reconstructing the stream to a more natural meandering pattern, off-stream watering, and fencing.

**Project Summary:** Emigrant Spring Creek (Park County), located on the Richard Kinkie property, is a tributary to the Yellowstone River. The lower reaches of the stream support spawning trout from the Yellowstone but the 2,500 ft located on the Kinkie property were channelized in the 1950's. Land management practices have also contributed to the degradation. Emigrant Spring Creek has been the subject of several actions aimed at restoring the resident fishery and increasing recruitment of trout to the Yellowstone River. Improvements in irrigation efficiency decreased the amount of water used, while maintaining crop production and enhancing spring creek flows through irrigation returns. Additions to ranch infrastructure, such as riparian fencing and development of off-channel water sources, have decreased livestock grazing pressure on riparian vegetation and improved stream bank stability. Stream channel restoration converted overly wide and shallow reaches, which had accumulated over a foot of fine sediment, to a narrow, deep, meandering channel capable of transporting its sediment load. Combined, these actions improved habitat quality for all life history stages of salmonids and other members of the native fish assemblage using this small stream.

**Monitoring:** Nine redds and seven digs were apparent on June 19, 2007, with most redds clustered within a small reach of stream (Figure 29). Although only nine distinct redds were observed, these probably reflect the activity of considerably more spawning fish. Several redds were large, with lengths and widths sometimes exceeding eight feet. The apparent variable ages of redds in Emigrant Spring Creek suggests both Yellowstone cutthroat trout and rainbow trout are using this stream.

Observations of current habitat condition, combined with review of pre-project photos, indicate marked improvements in riparian health and vigor, and instream habitat on Emigrant Spring Creek. Pre-project photos show a wide and shallow stream channel with poor sediment transport capabilities and impaired riparian health and function. Conditions in June of 2007 were in marked contrast to pre-restoration condition. Riparian vegetation was robust with herbaceous and woody vegetation providing shade and overhead cover. The stream channel was narrow and deep, which provided better habitat to resident fish. The improved sediment transport capacity of the restored channel prevented accumulation of fine sediment on the streambed increased the suitability of this stream for spawning by trout, including the sensitive Yellowstone cutthroat trout.



Redd counts and habitat observations indicate the Emigrant Spring Creek restoration project was successful in meeting its objectives. The number, size, and apparent age of redds indicate this stream is supporting a Yellowstone cutthroat trout spawning run, as well as a rainbow trout run. Similarly, riparian vegetation, stream habitat, and water quality have improved substantially from restoration conditions. The strength of the spawning run in Emigrant Spring Creek, within just two spawning seasons after completion of the project, is an indicator of the project's success. The benefits will extend beyond Emigrant Spring Creek, by increasing recruitment of Yellowstone cutthroat trout to the Yellowstone River. This increases the fish's chances of persisting in the Yellowstone River and provides anglers with a unique experience to catch wild, native Yellowstone cutthroat trout. The conservation and recreational benefits to the larger river system justify the project expenditure and use of public funds.





